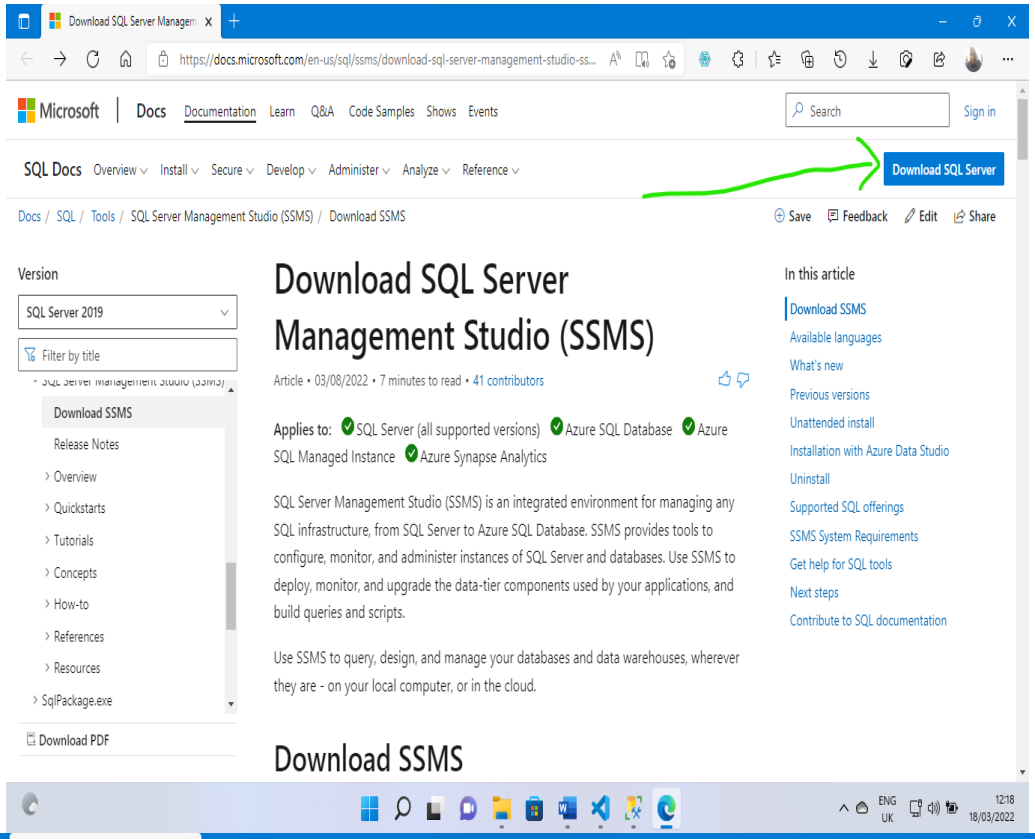
HOW TO START YOUR DATA ANALYSIS WITH SQL

If you are looking to start your data analytics and visualization journey.There you are in the right place,as this blog post would guide you step by step on how to start.In data analytics and visualization,there are required softwares(tools) that you must have.You would need a personal computer(desktop or mobile computer;laptop) to be able to help you install the required softwares(tools).This required softwares(tools),must haves' I should say are Microsoft Excel,SQL software(for requesting data present in an offline or online database e.g Oracle Database,Microsoft SQL Database,Microsoft Acess Database amongst other),Python,Jupyter(Notebook), & Microsoft Power BI.Reteriating on what I earlier wrote above,this blog post from start to finish would be all about showing step by processes of accomplishing of accomplishing a task in the form of Images and Written programming codes.So start I would show you how to install and setup a database accessing software(tool) called Microsoft SQL Server Management Studio.To download the software,you have to visit the software website with an internet browser,e.g microsoft edge,google chrome ,firefox,etc on https://docs.microsoft.com/en-us/sql/ssms/download-sql-server-management-studio-ssms?view=sql-server-ver15 (version updates are released from time to time,do well to download the latest version stable **version**)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Article • 03/08/2022 • 7 minutes to read • 41 contributors
Applies to: SQL Server (all supported versions) Azure SQL Database Azure SQL Managed Instance Azure Synapse Analytics
SQL Server Management Studio (SSMS) is an integrated environment for managing any SQL infrastructure, from SQL Server to Azure SQL Database. SSMS provides tools to configure, monitor, and administer instances of SQL Server and databases. Use SSMS to deploy, monitor, and upgrade the data-tier components used by your applications, and build queries and scripts.
Use SSMS to query, design, and manage your databases and data warehouses, wherever they are - on your local computer, or in the cloud.
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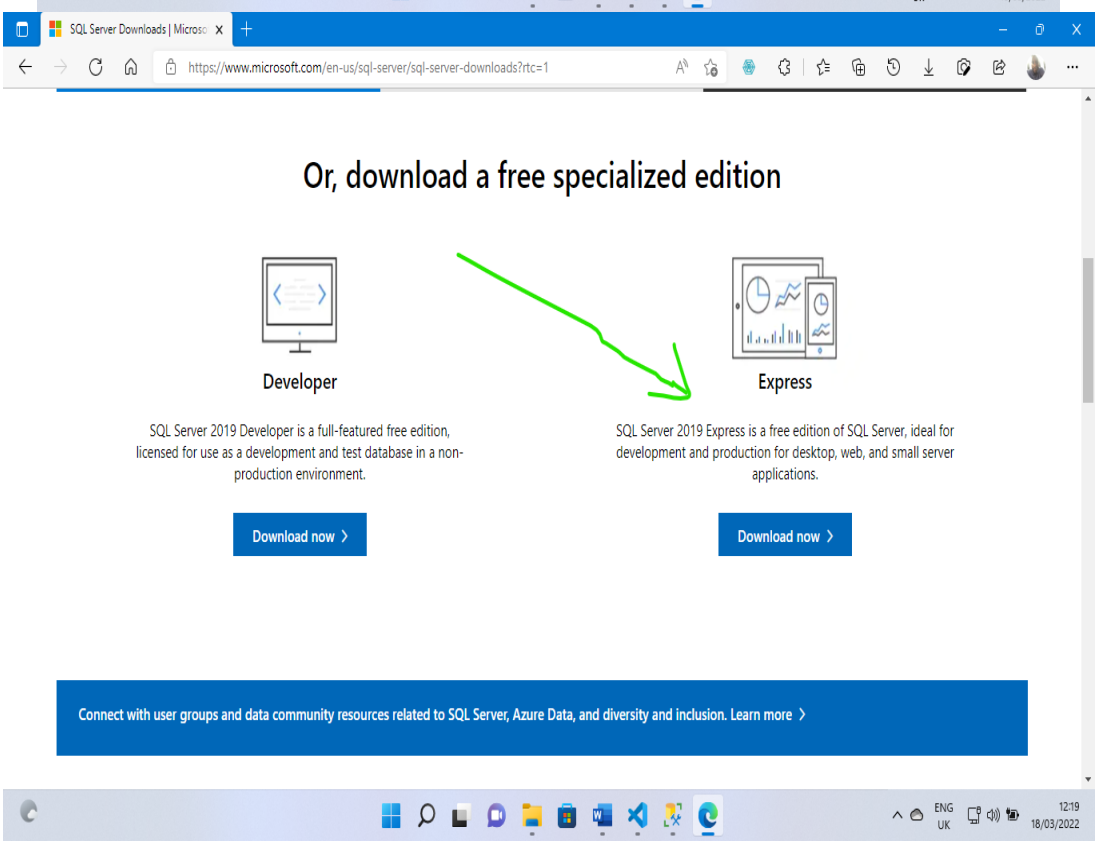
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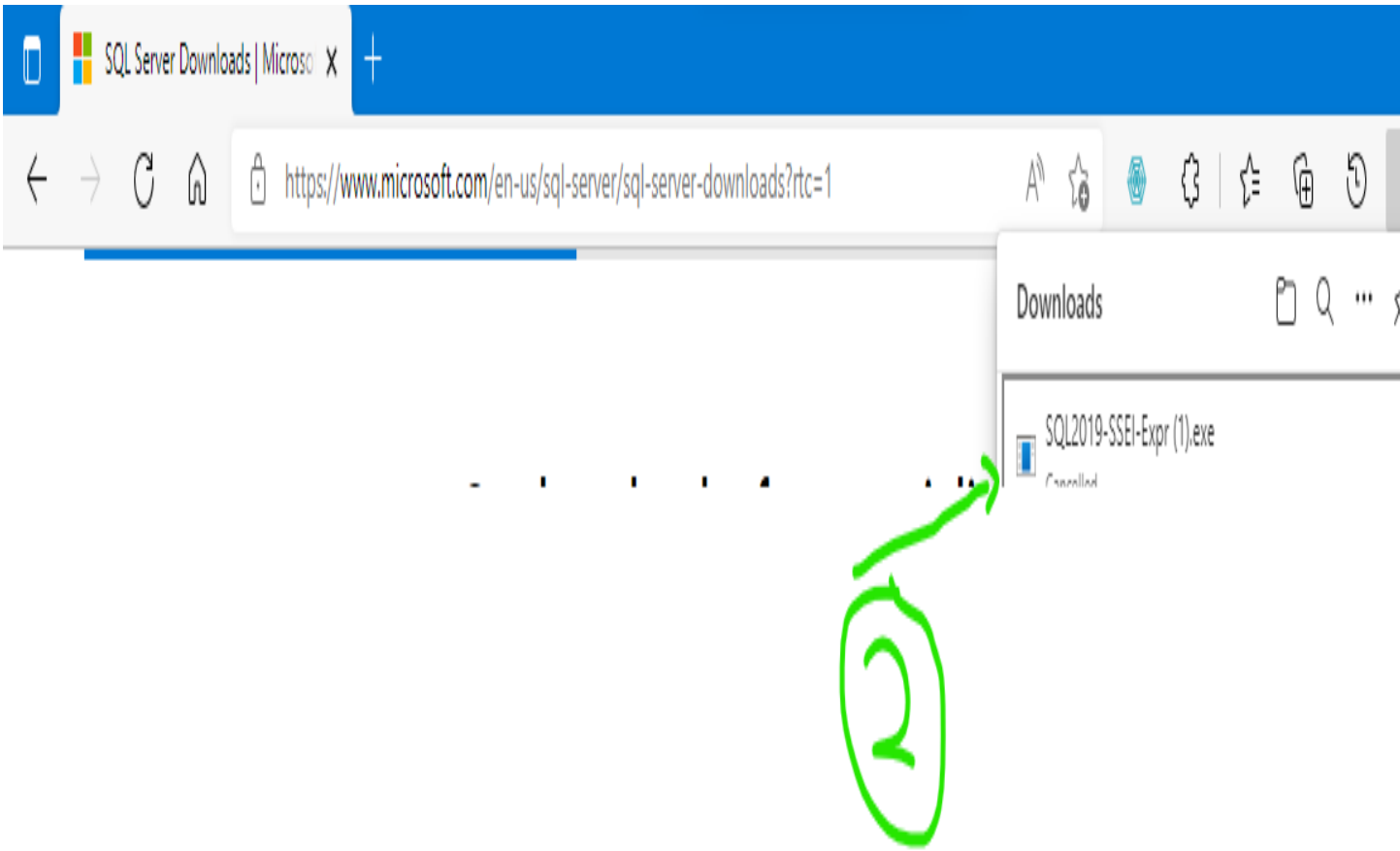
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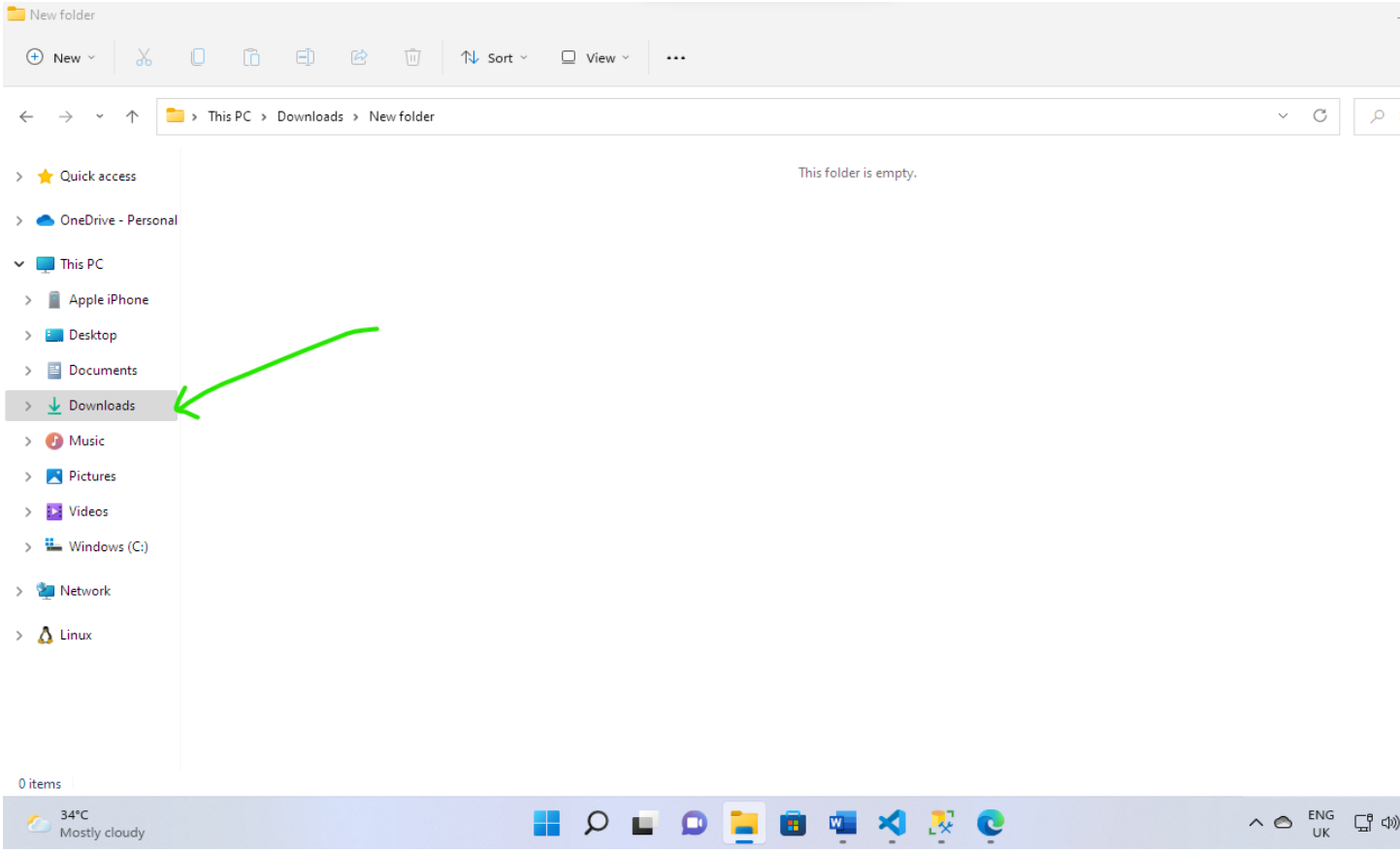
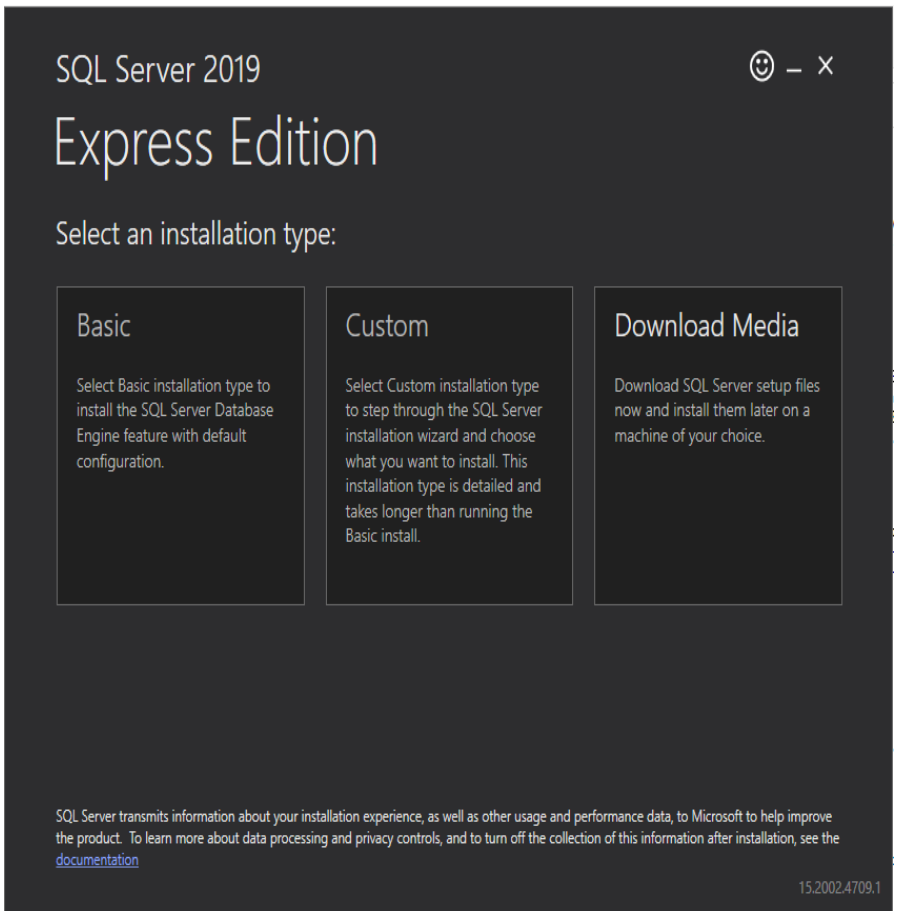
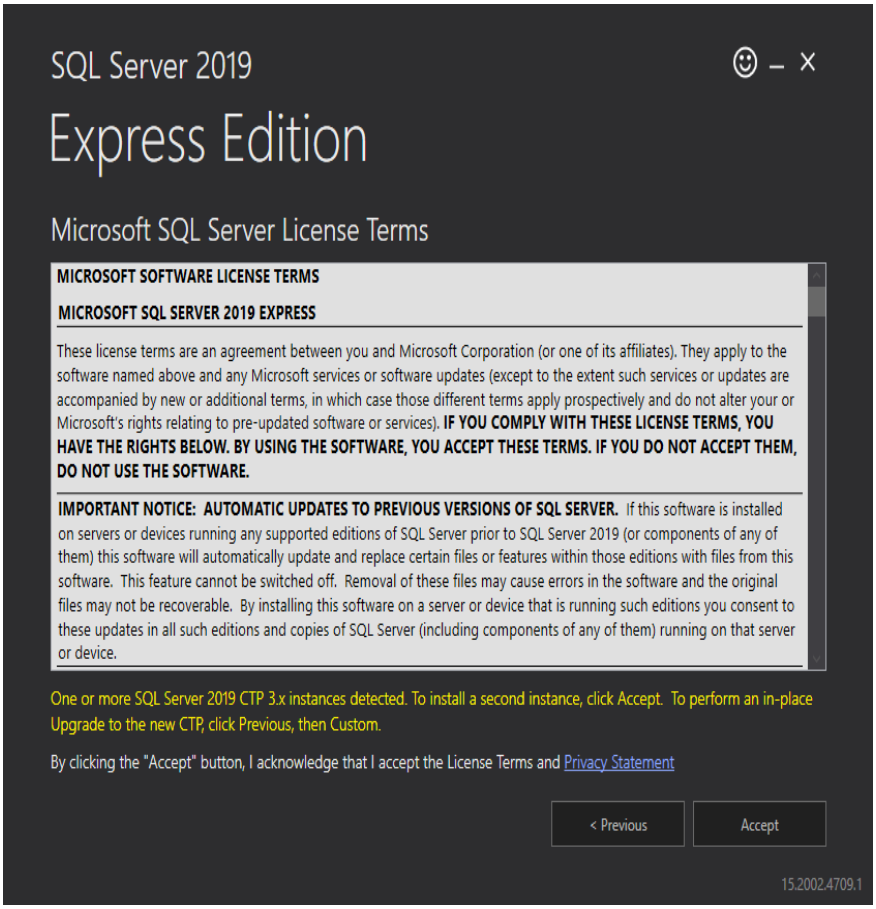


After clicking on the setup file,series of steps are required from you the user.First select **Basic** as installation type,next **accept the software license agreement,**after which you **specify where to install the sql server software**


SQL Server 2019
Express Edition
Select an installation type:
Basic
Select Basic installation type to install the SQL Server Database Engine feature with default configuration.
Custom
Select Custom installation type to step through the SQL Server installation wizard and choose what you want to install. This installation type is detailed and takes longer than running the Basic install.
Download Media
Download SQL Server setup files now and install them later on a machine of your choice.
SQL Server transmits information about your installation experience, as well as other usage and performance data, to Microsoft to help improve the product. To learn more about data processing and privacy controls, and to turn off the collection of this information after installation, see the documentation
15.2002.4709.1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Express Edition
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Accept
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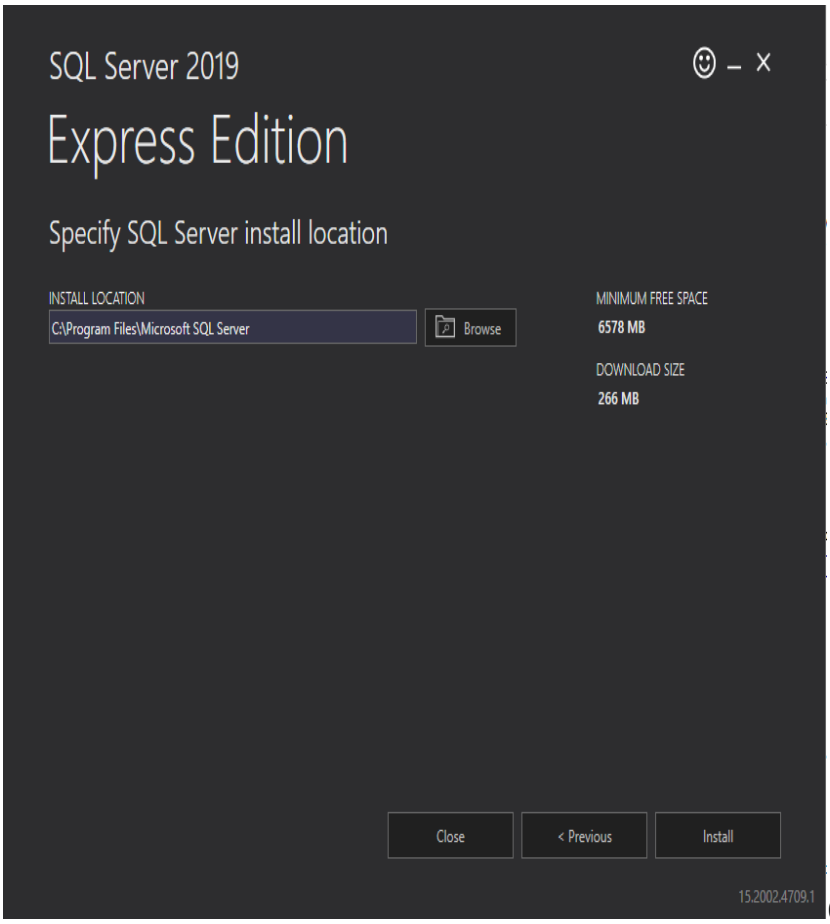


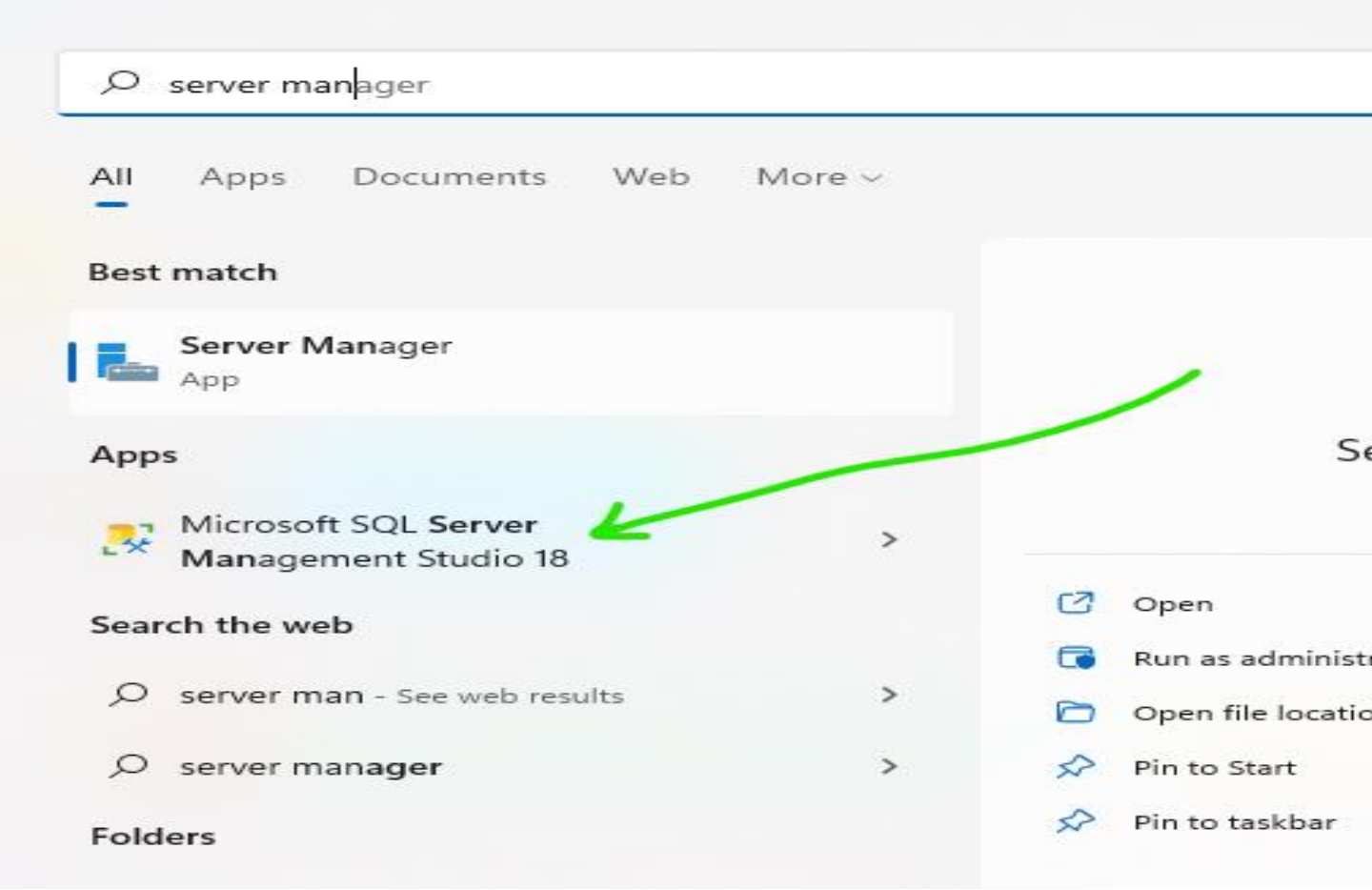
0

Figure 1-User Interface 1

Figure 2-User Interface 2

Figure 3-User Interface 3

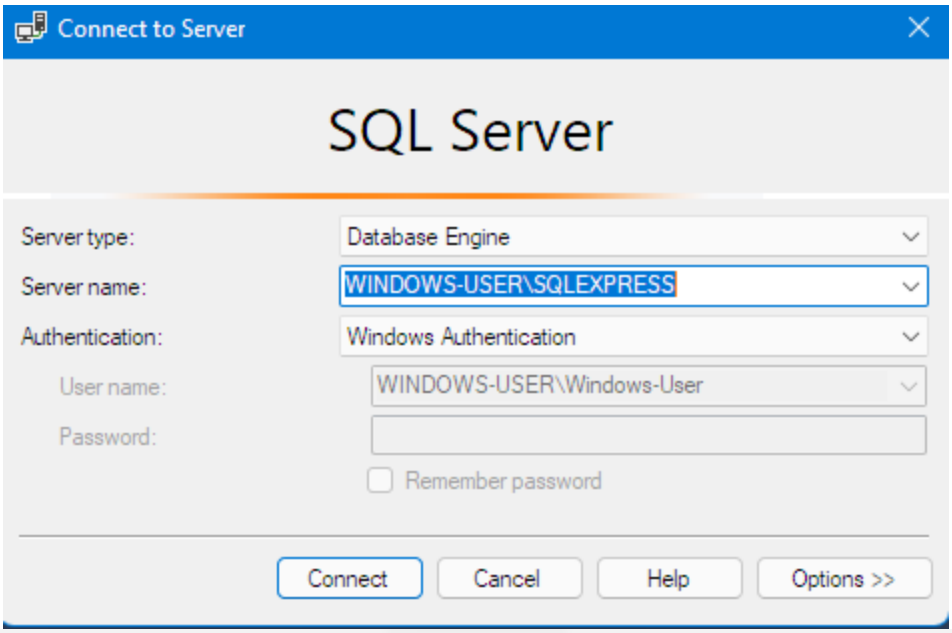
If the steps are properly followed,the software should install successfully,after which you can then launch the software from the windows start menu,see Image below

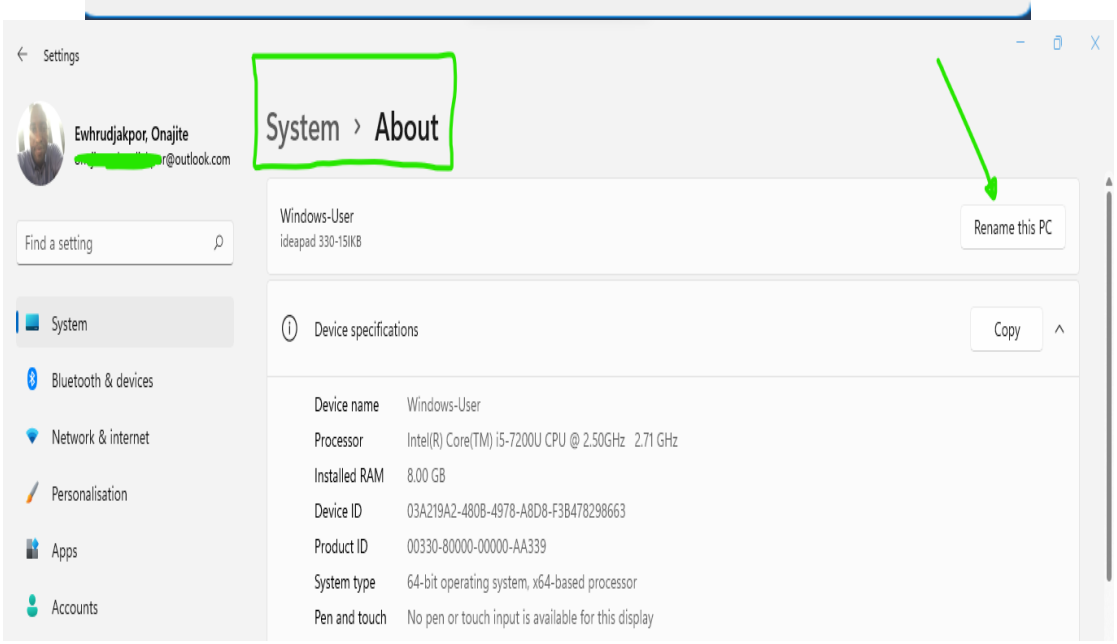


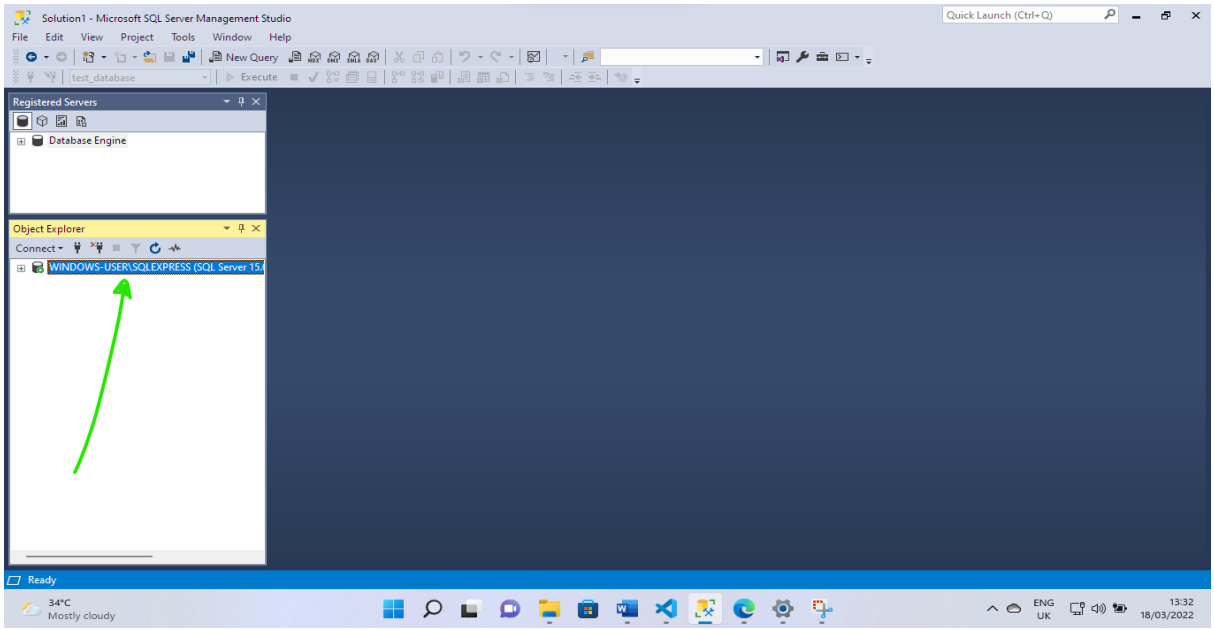
On the software launch,an interacrive window would pop up(see Image below),requiring your assistance to connect to an sql server.Select **Database Engine** as server type,this would enable you use an offline database for data analysis.**The server name and authentication**

Input boxes should automatically fill up with information.Check to see if the server name input box includes your correct computer name.The server name format is **your own computer name\SQLEXPRESS** e.g if you renamed your your computer name as “Micheal” in the about section(see Image Below) of your personal computer OS**,**then the server name should be **Micheal\SQLEXPRESS.**Failure to properly configure this section very well would make the software not to function properly.You would not be able to locally have a server running and even be able to connect to a local server that would enable you to practise analyse data with SQL.If everything is right as shown in the first image below,click on the **connect** button.You would be connected successfully to

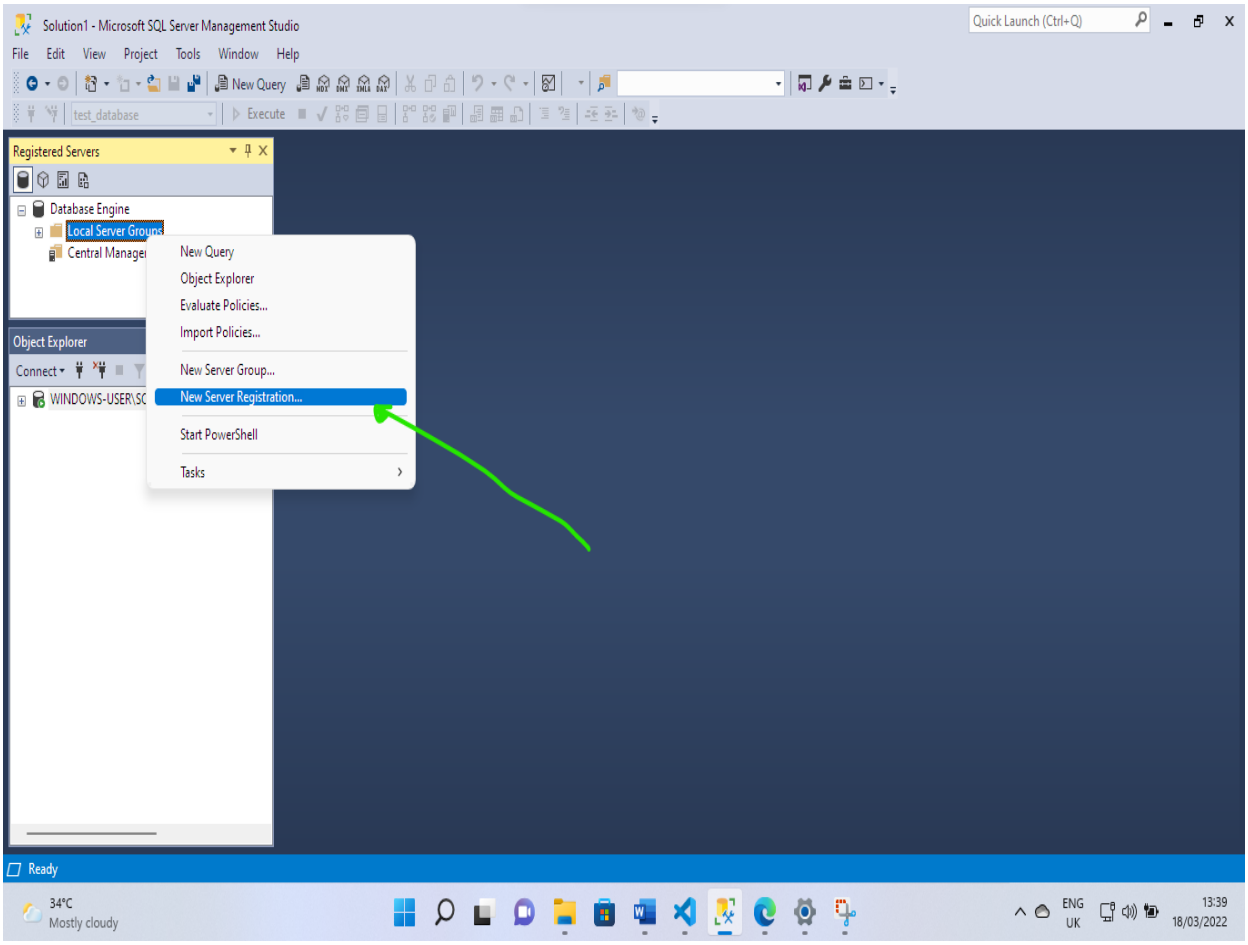
a local server, **your own computer name\SQLEXPRESS** server,In my case I have no login computer logon password set,hence the User name and Password input boxes are set to ready-only.see Images below.


Connect to Server
SQL Server
Server type:
Database Engine
Server name:
WINDOWS-USER\SQLEXPRESS
Authentication:
Windows Authentication
User name:
WINDOWS-USER\Windows-User
Password:
Remember password
Connect
Cancel
Help
Options >>


Settings
Ewhrudjakpor, Onajite
@outlook.com
Find a setting
System
Bluetooth & devices
Network & internet
Personalisation
Apps
Accounts
System › About
Windows-User
ideapad 330-15IKB
Rename this PC
Device specifications
Copy
Device name Windows-User
Processor Intel(R) Core(TM) i5-7200U CPU @ 2.50GHz 2.71 GHz
Installed RAM 8.00 GB
Device ID 03A219A2-480B-4978-A8D8-F3B478298663
Product ID 00330-80000-00000-AA339
System type 64-bit operating system, x64-based processor
Pen and touch No pen or touch input is available for this display



It is also possible to possible to register your own server.By expanding the **database engine** within the **registered server pane** and selecting **local server group**,then clicking **new server registration**.See Image below


Solution1 - Microsoft SQL Server Management Studio
Quick Launch (Ctrl+Q)
File Edit View Project Tools Window Help
New Query
test_database
Execute
Registered Servers
Database Engine
Local Server Groups
Central Manager
New Query
Object Explorer
Evaluate Policies...
Import Policies...
New Server Group...
New Server Registration...
Start PowerShell
Tasks
Object Explorer
Connect
WINDOWS-USER\SC
Ready
34°C
Mostly cloudy
ENG
UK
13:39
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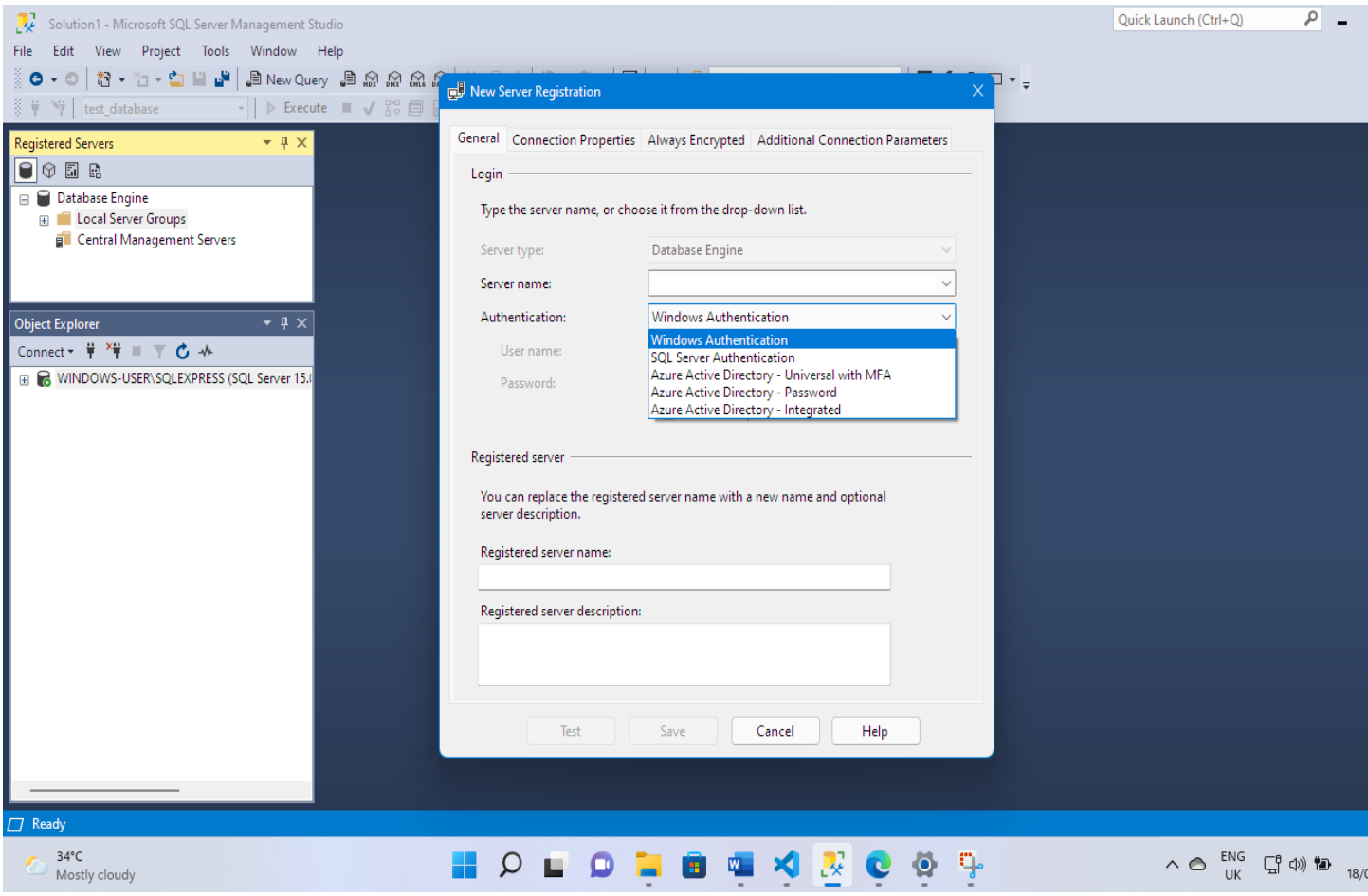
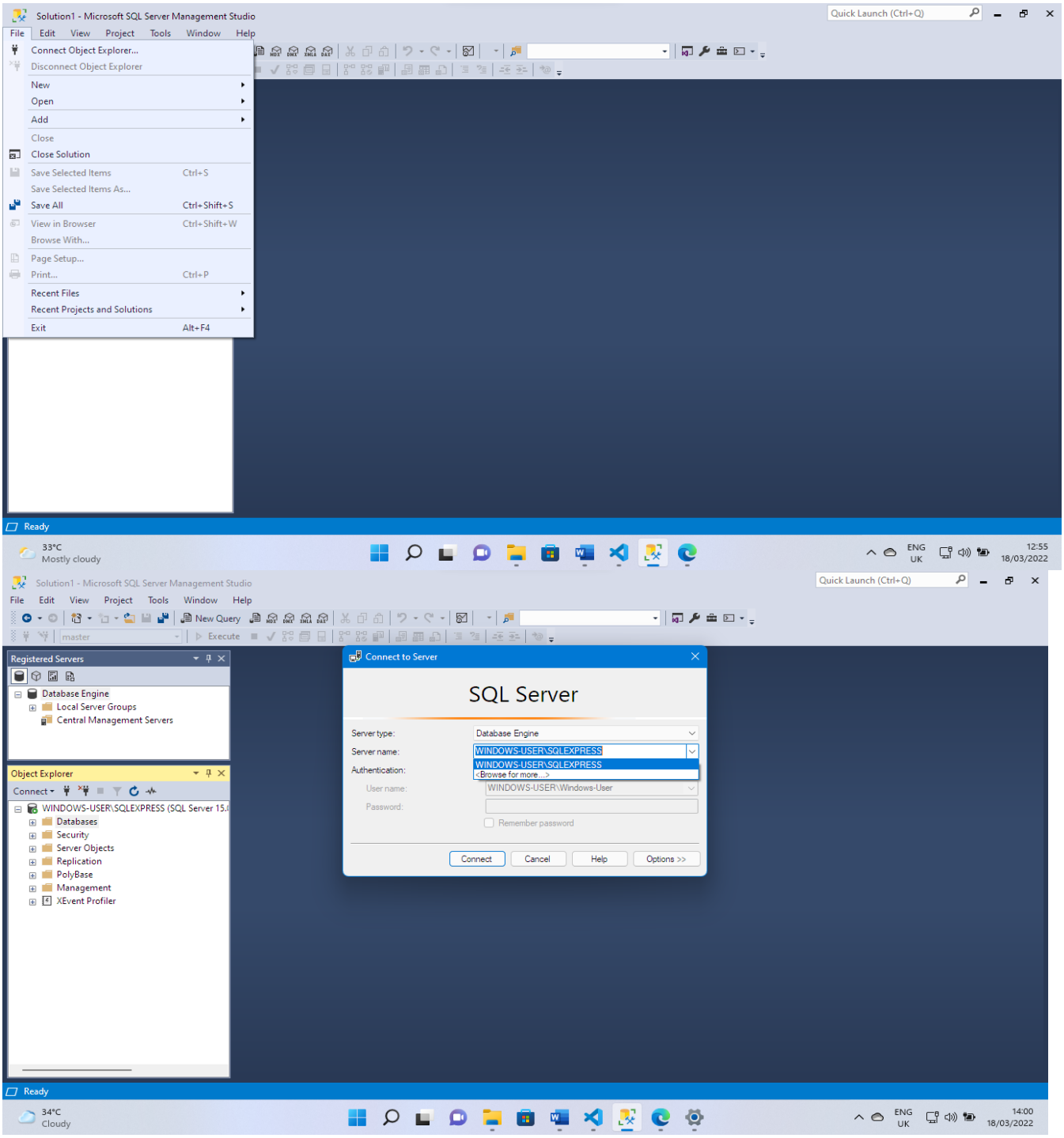
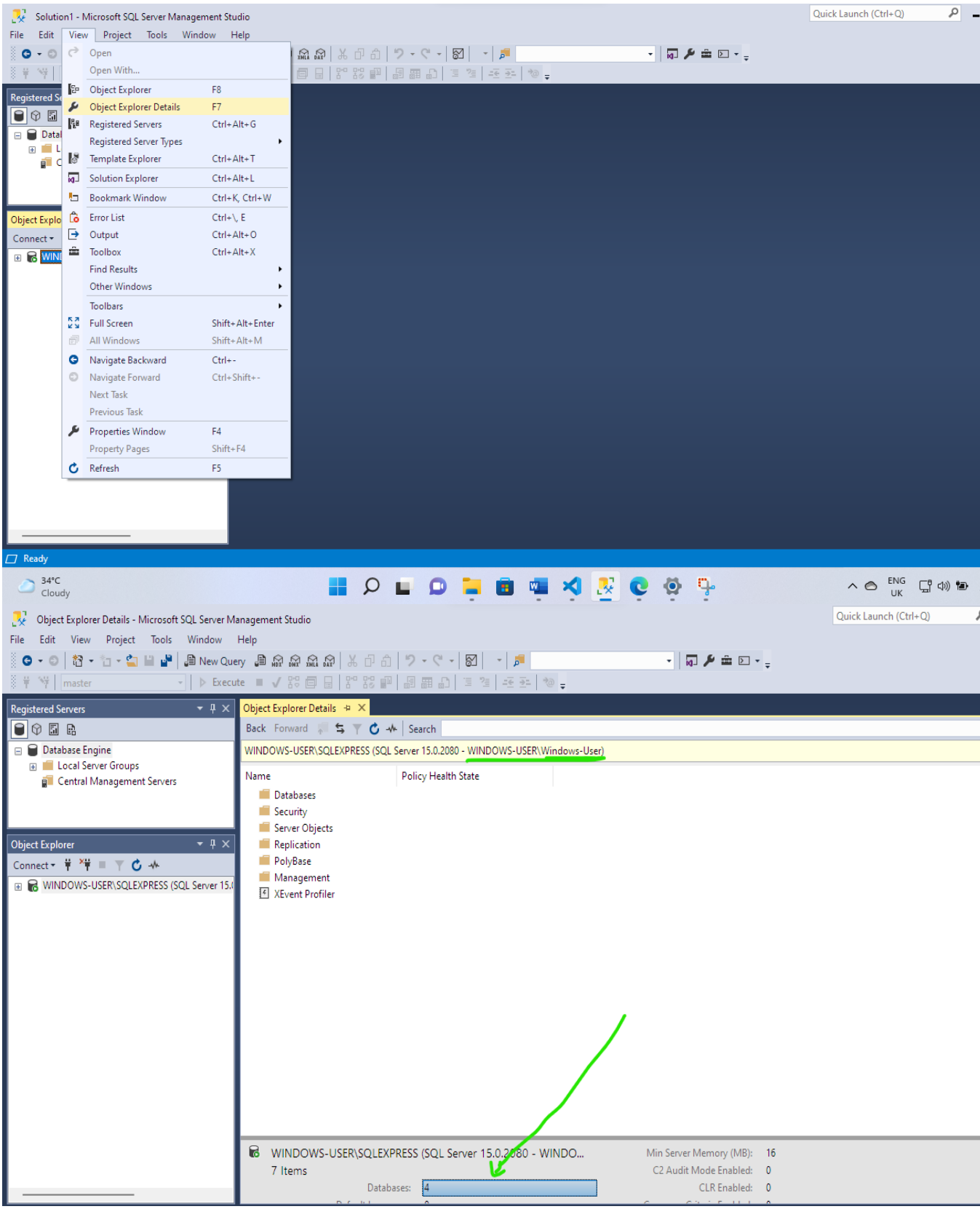


Input the server name,then from the drop box besides authentication field,select the authentication method,you have five(5) options.This requires a little bit of expertise as other authentication options aside from the windows authentication method would require you to request separate login details.**Click on test then save** to successfully register a new server.You can also connect to an existing server by **clicking on the file tab then clicking on connect object explorer,selecting the right server credentials and clicking on ok.**See Image below

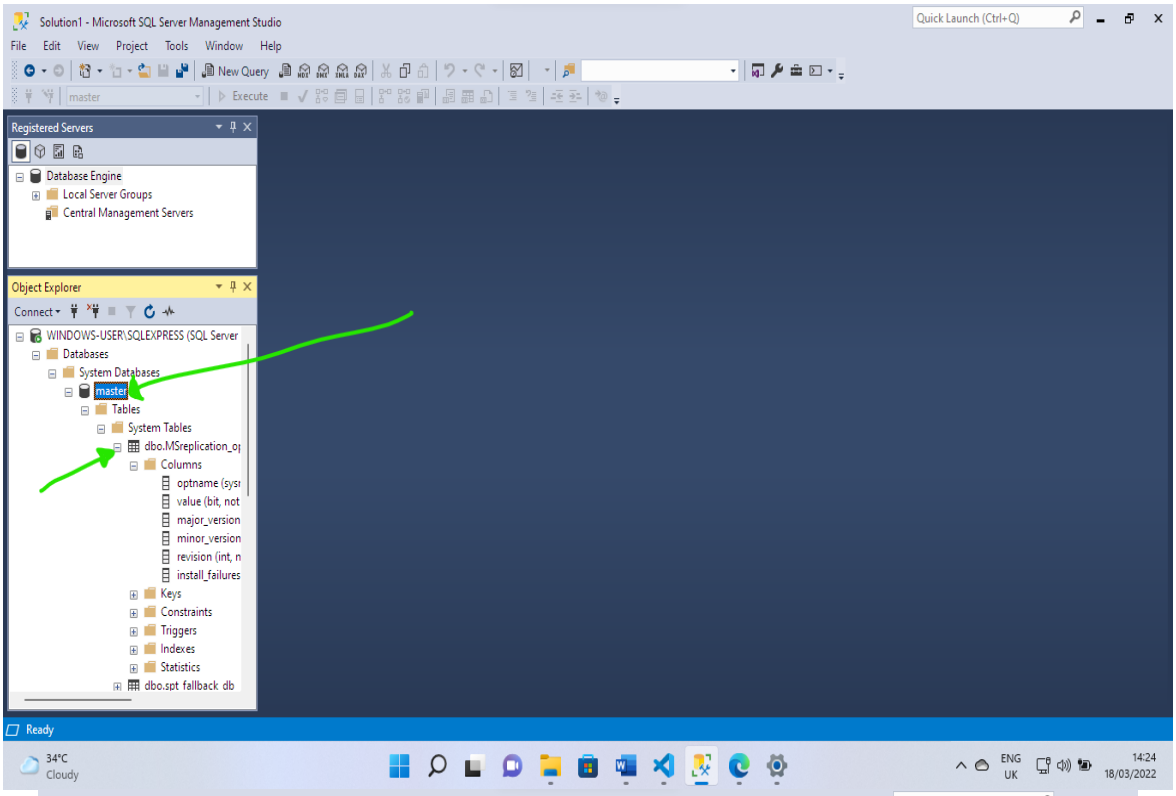


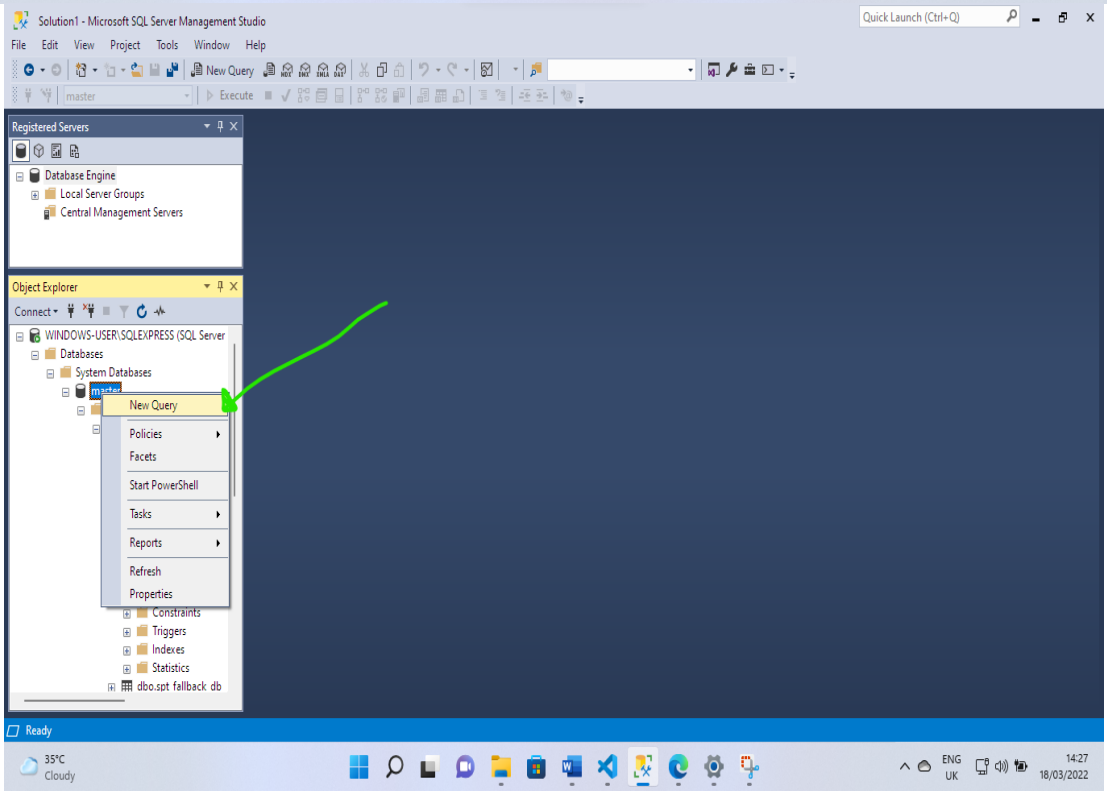
- Next on this blog post would be to connect to a test database and table present in the Microsoft sql server management studio and begin data analysis.

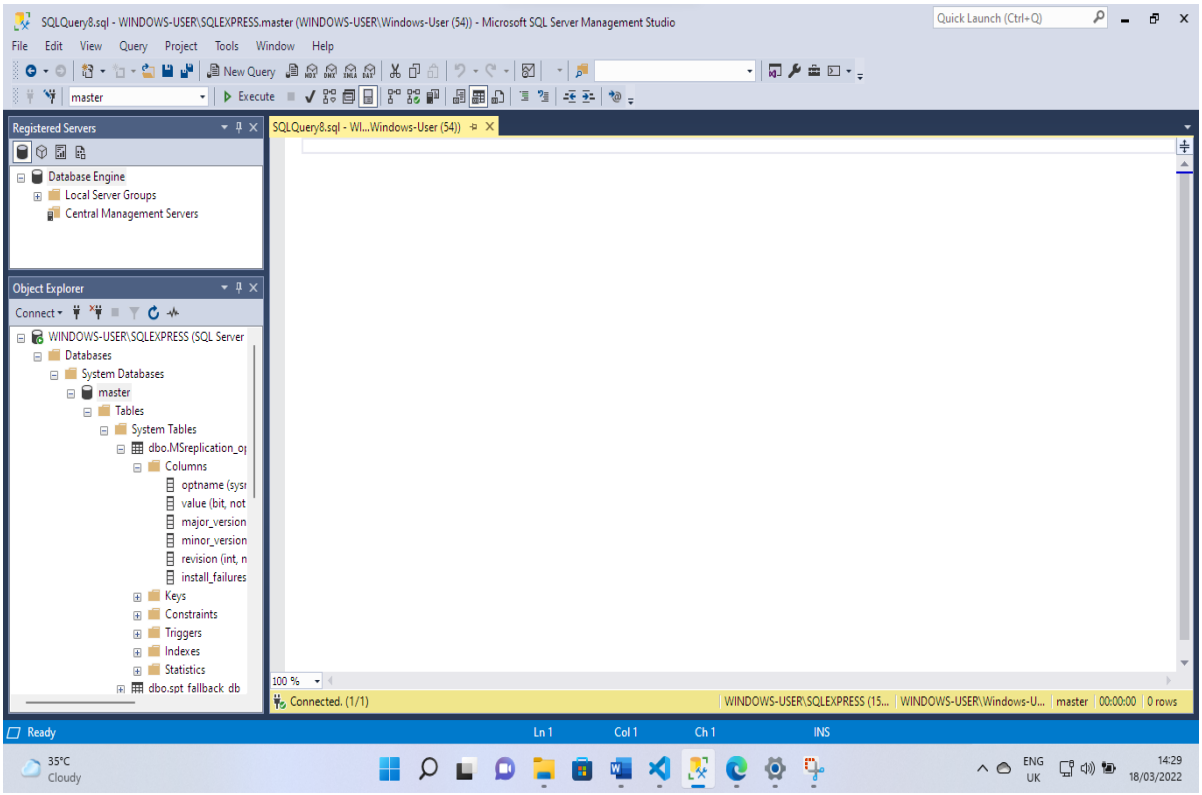
In Microsoft sql server management studio,there are four databases that come pre installed with the software.You can know how many databases are utilising an active server(i.e a server that you have successfully connected to) by clicking on the view tab inside the software and selecting object explorer details or press f7 on your keyboard.A window having information containing how many databases are utilising an active server would pop up.See Images below


Solution1 - Microsoft SQL Server Management Studio
File Edit View Project Tools Window Help
Quick Launch (Ctrl+Q)
Open
Open With...
Object Explorer F8
Object Explorer Details F7
Registered Servers Ctrl+Alt+G
Registered Server Types
Template Explorer Ctrl+Alt+T
Solution Explorer Ctrl+Alt+L
Bookmark Window Ctrl+K, Ctrl+W
Error List Ctrl+\, E
Output Ctrl+Alt+O
Toolbox Ctrl+Alt+X
Find Results
Other Windows
Toolbars
Full Screen Shift+Alt+Enter
All Windows Shift+Alt+M
Navigate Backward Ctrl+-
Navigate Forward Ctrl+Shift+-
Next Task
Previous Task
Properties Window F4
Property Pages Shift+F4
Refresh F5
Connect
Ready
34°C
Cloudy
ENG
UK
Object Explorer Details - Microsoft SQL Server Management Studio
File Edit View Project Tools Window Help
New Query
Execute
master
Registered Servers
Database Engine
Local Server Groups
Central Management Servers
Object Explorer
Connect
WINDOWS-USER\SQLEXPRESS (SQL Server 15.0
Object Explorer Details
Back Forward Search
WINDOWS-USER\SQLEXPRESS (SQL Server 15.0.2080 - WINDOWS-USER\Windows-User)
Name
Policy Health State
Databases
Security
Server Objects
Replication
PolyBase
Management
XEvent Profiler
WINDOWS-USER\SQLEXPRESS (SQL Server 15.0.2080 - WINDO...
7 Items
Databases: 4
Min Server Memory (MB): 16
C2 Audit Mode Enabled: 0
CLR Enabled: 0

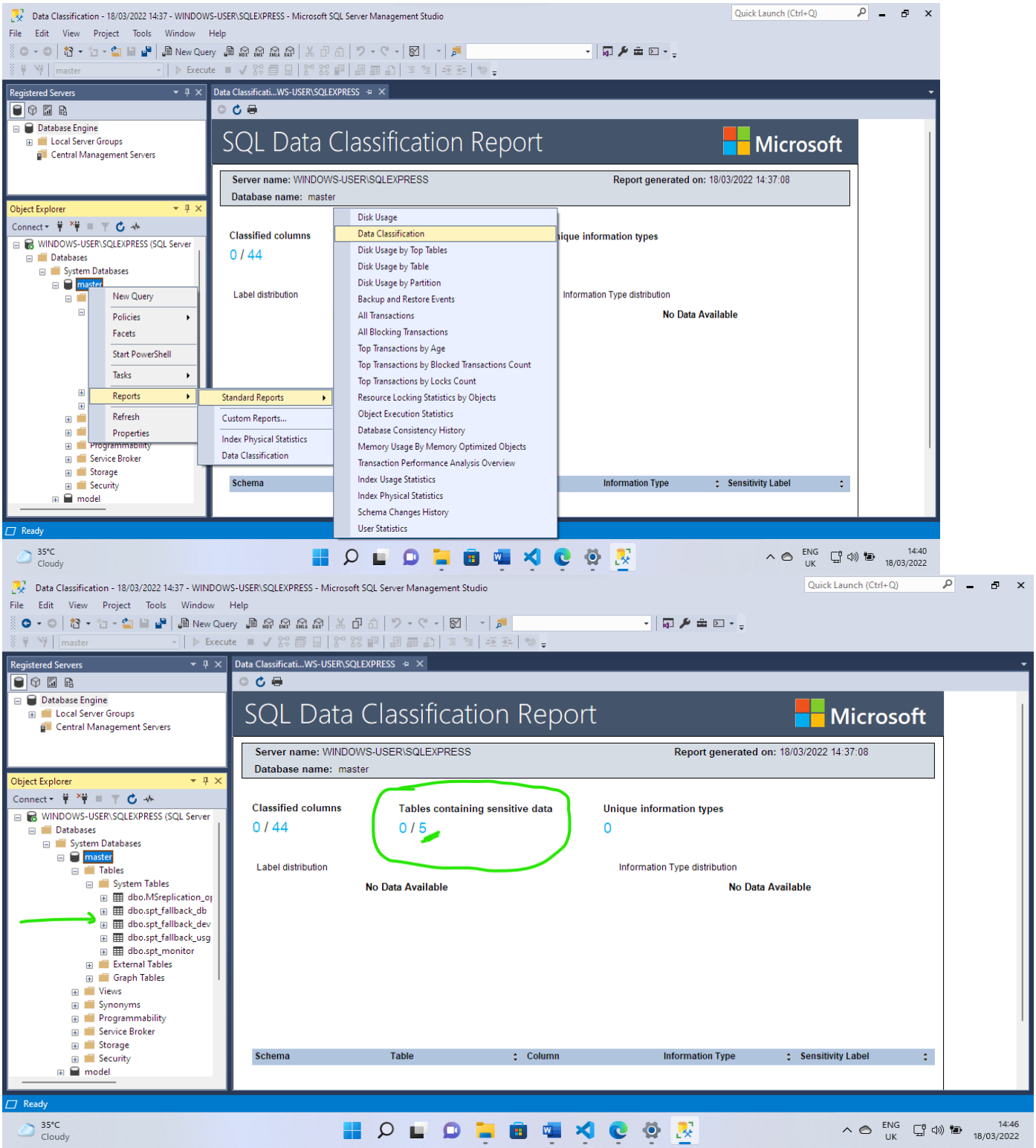
We can now go ahead and retrieve information from a pre created database within the software as part of the data analysis process.We would be retrieving data from the master database,one of the pre created database available with a freshly installed Microsoft sql server management studio.See Images and code snippets below


Solution1 - Microsoft SQL Server Management Studio
File Edit View Project Tools Window Help
New Query
Execute
Registered Servers
Database Engine
Local Server Groups
Central Management Servers
Object Explorer
Connect
WINDOWS-USER\SQLEXPRESS (SQL Server
Databases
System Databases
master
Tables
System Tables
dbo.MSreplication_o
Columns
optname (sys
value (bit, not
major_version
minor_version
revision (int, n
install_failures
Keys
Constraints
Triggers
Indexes
Statistics
dbo.spt fallback db
Ready
34°C
Cloudy
ENG
UK
14:24
18/03/2022


Solution1 - Microsoft SQL Server Management Studio
File Edit View Project Tools Window Help
New Query
Execute
Registered Servers
Database Engine
Local Server Groups
Central Management Servers
Object Explorer
Connect
WINDOWS-USER\SQLEXPRESS (SQL Server
Databases
System Databases
master
New Query
Policies
Facets
Start PowerShell
Tasks
Reports
Refresh
Properties
Constraints
Triggers
Indexes
Statistics
dbo.spt fallback db
Ready
35°C
Cloudy
ENG
UK
14:27
18/03/2022



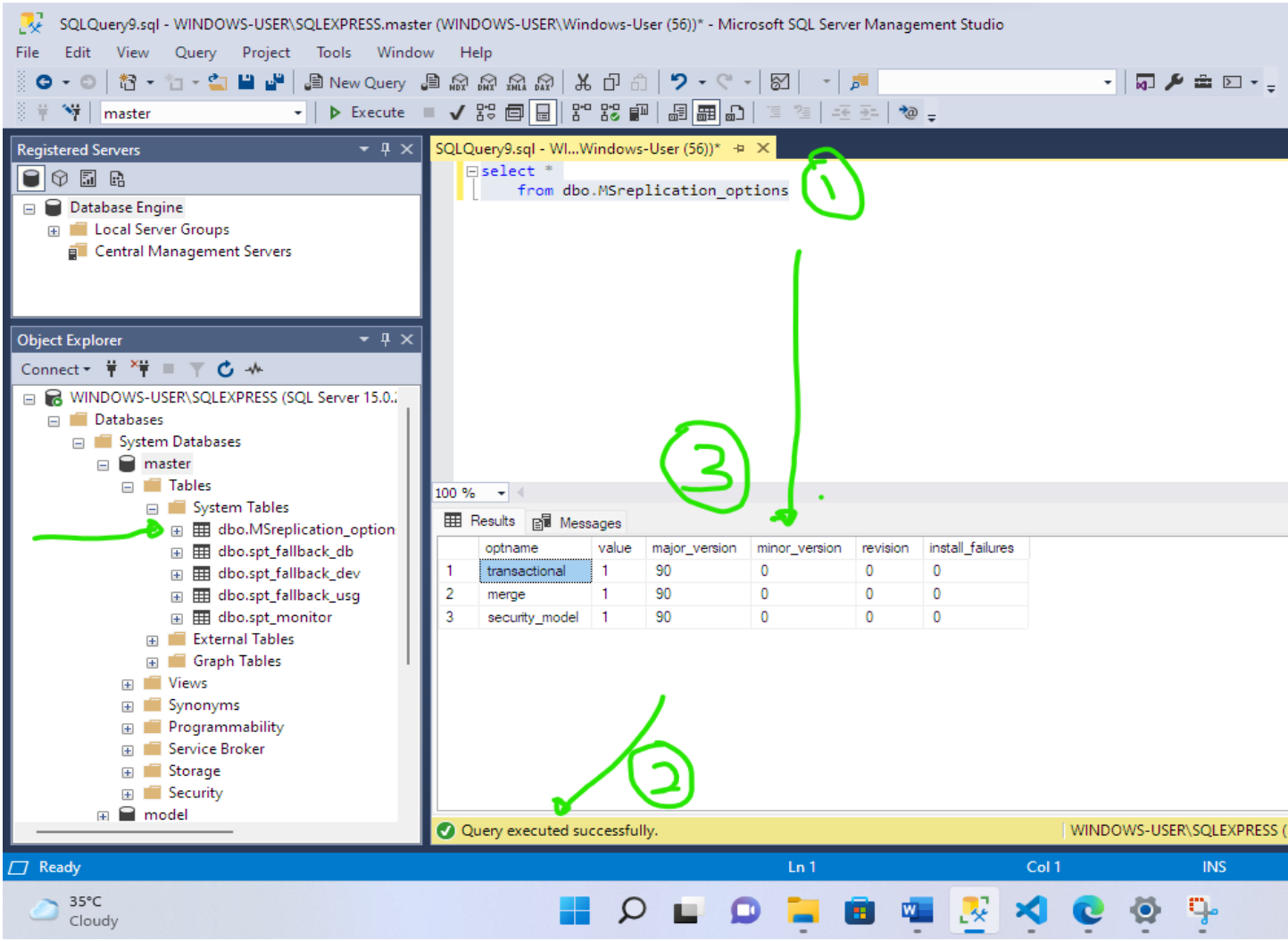
You can know the number of tables present in a database by right clicking on the database and selecting **reports** from the pop up menu and **standard report** then **data classification**.In our test database,**master**,it has five(5) tables containing data stored in it.See Image below



Series of sql function keywords can be used to retrieve information from the database table.Some of this function keywords are SELECT,ALIAS,FROM,WHERE,GROUP,HAVING,ORDER

BY,COUNT,DISTINCT,JOIN(INNER,OUTER,LEFT,RIGHT),AND,BETWEEN,OR,IN,LIKE,IS LIKE,Wild card(%),IS NULL,SUM,AVERAGE,can also be prove useful.Below are the written codes containing the sql function keywords to successfully retrieve data from the master database and one of the tables(**dbo.MSreplication_options**) under the master database containing fields(columns or headers) and rows(records or information) as well as its Image outputs.You can replicate same step with the codes.

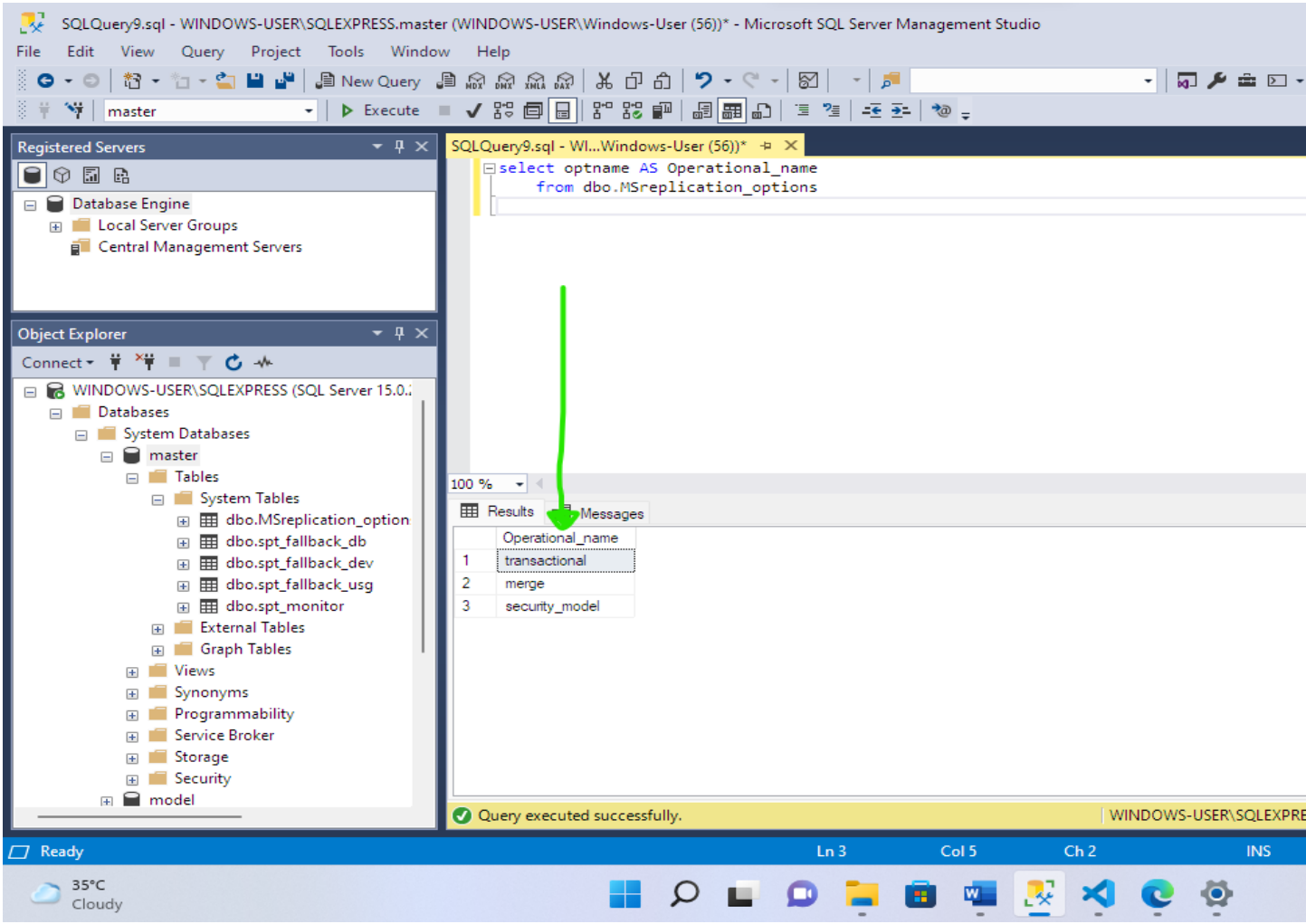
```
select *
from
dbo.MSreplication_optio
ns
```



Here is an **sql code selecting just one column(field or header) from the available six(6) columns** and also renaming the column header(field) using **alias.**The

original column name was **optname.**Image snapshot is provided after the code below.

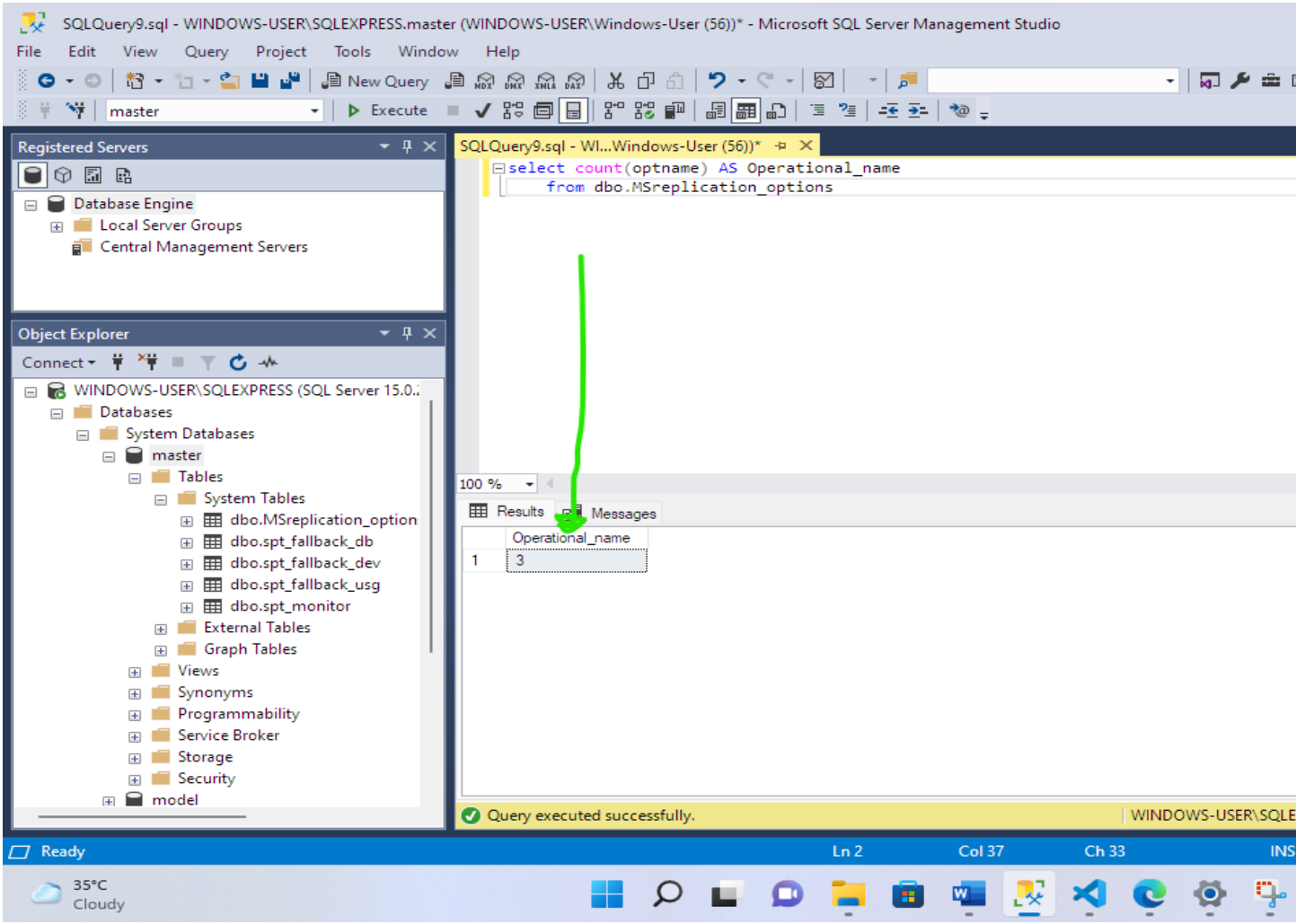
```
select optname AS Operational_name
        from dbo.MSreplication_options
```



This code below displays the count(total number) of all rows present in the aliased table(operational_name) above.Snapshot after the code

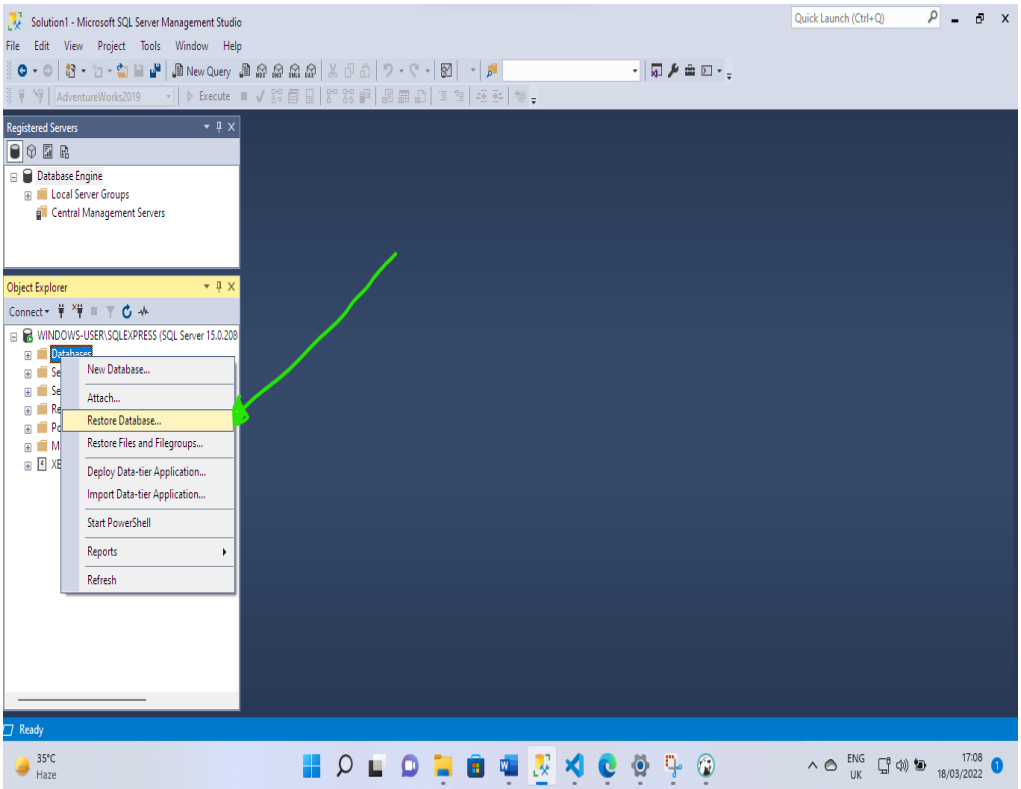
```
select count(optname) AS Operational_name
```

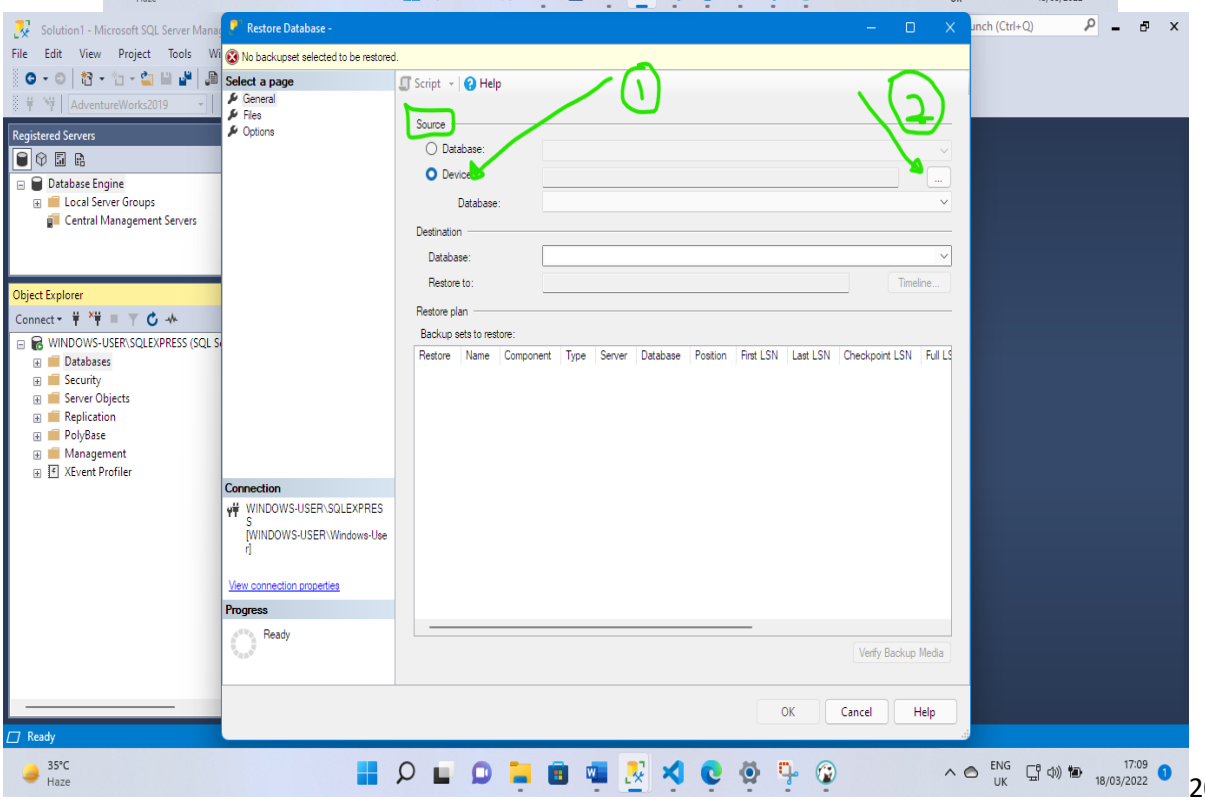
from dbo.MSreplication_options

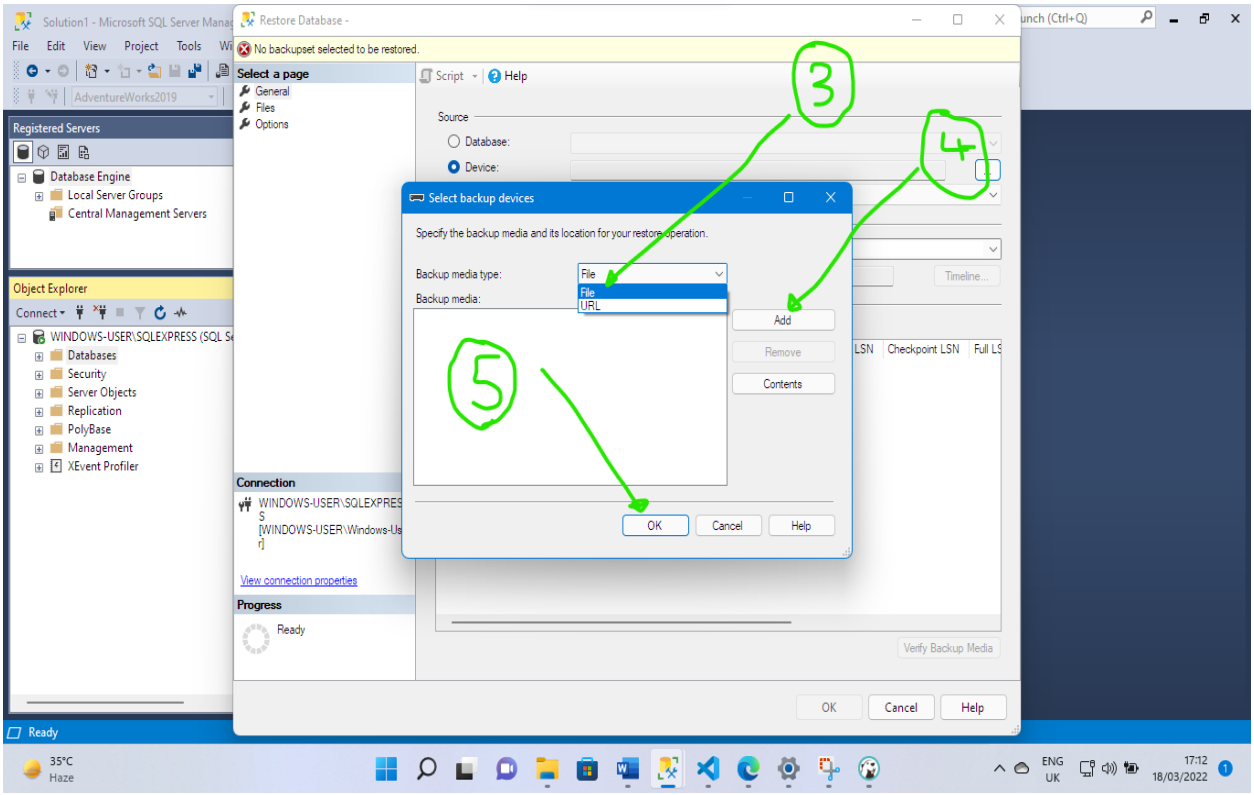


The dbo.MSreplication_options table inside the master database is not giving us much opportunity to explore,so we are going to import an external database and continue data analysis with it.The URL to download the external dataset after download completion that would be used for further analysis is https://github.com/Microsoft/sql-server-samples/releases/download/adventureworks/AdventureWorks2019.bak the database present in the just given github url is a backup file,meaning it is backup file of a database,in this case,**the adventureworks sample database** provided by Microsoft.To make use of the sample database file downloaded as **.bak(**.bak is short form of backup),the downloaded sample database would have to be present in a **backup** folder present inside the server management studio main

folder,the file path in own case is **C:\Program Files\Microsoft SQL Server\MSSQL15.SQLEXPRESS\MSSQL\Backup**,having the backup file inside of the backup folder is important,as this would make it possible for Microsoft sql server management studio to detect the presence of a .bak database file. After successfully copy the sample database file to the backup folder,we need to make use a **restore feature** present in the microsoft sql server management studio software.This restore feature called **restore database** can be accessed by right clicking on the **database folder**,already present in a freshly installed Microsoft sql server management studio software,and selecting **restore database**,then selecting **device button option in** the pop up menu **within the source selection section**,then clicking on the three dotted box,**right of the source selection section,selecting file as backup media type,wich can be accessed by clicking on a drop down button,after which you click on add** and then finally **selecting** the required database name to restore from the available backup databases,then click on **ok**.See Images below

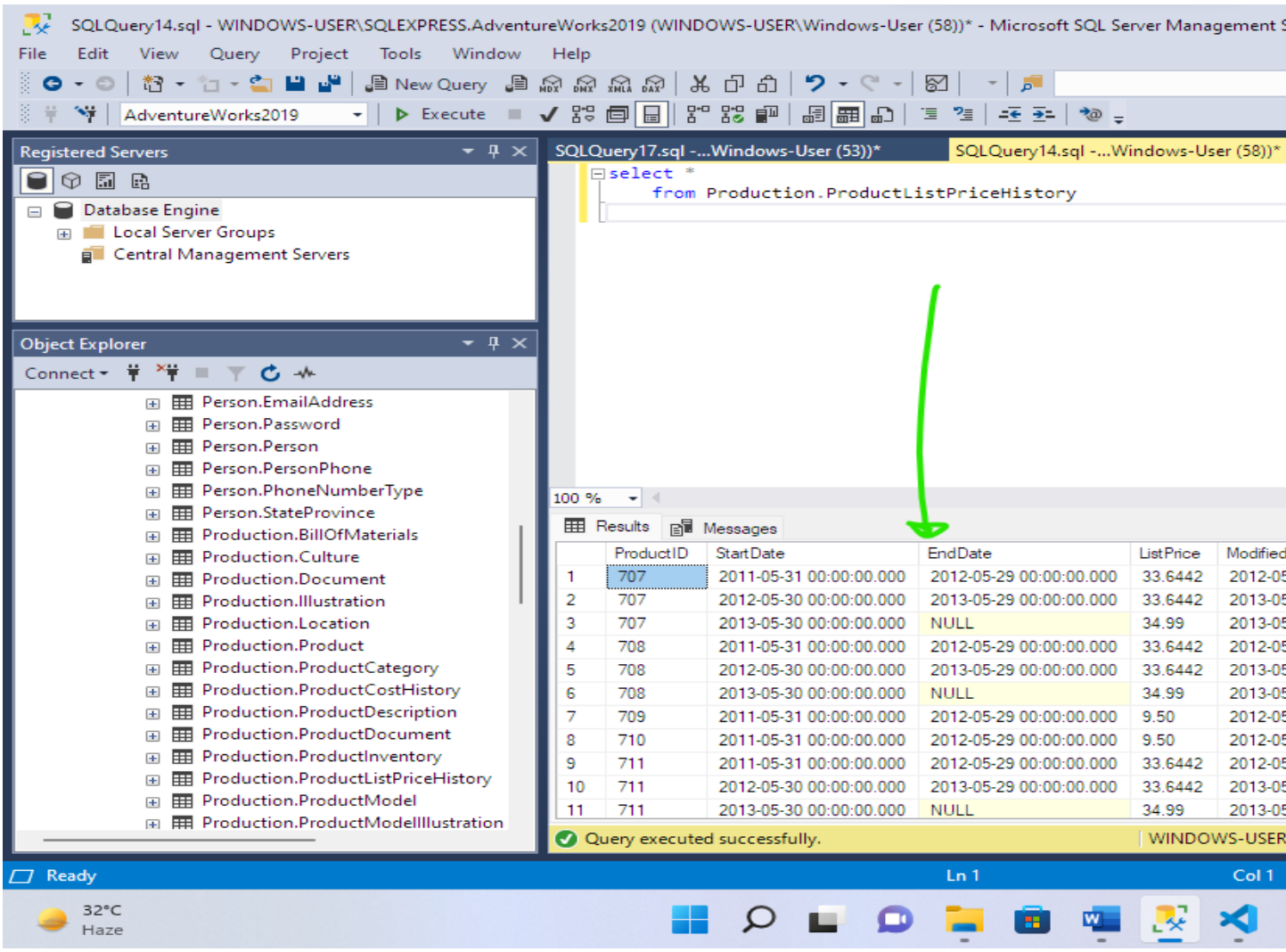

Solution1 - Microsoft SQL Server Management Studio
File Edit View Project Tools Window Help
New Query
Execute
Registered Servers
Database Engine
Local Server Groups
Central Management Servers
Object Explorer
Connect
WINDOWS-USER\SQLEXPRESS (SQL Server 15.0.208
Databases
New Database...
Attach...
Restore Database...
Restore Files and Filegroups...
Deploy Data-tier Application...
Import Data-tier Application...
Start PowerShell
Reports
Refresh
Ready


Restore Database -
No backupset selected to be restored.
Select a page
General
Files
Options
Script
Help
Source
Database:
Device:
Destination
Database:
Restore to:
Timeline...
Restore plan
Backup sets to restore:
Restore
Name
Component
Type
Server
Database
Position
First LSN
Last LSN
Checkpoint LSN
Connection
WINDOWS-USER\SQLEXPRESS
[WINDOWS-USER\Windows-User]
View connection properties
Progress
Ready
Verify Backup Media
OK
Cancel
Help
Object Explorer
Databases
Security
Server Objects
Replication
PolyBase
Management
XEvent Profiler
Ready



Now we would continue our data analysis but with a new database,recollect the reason why? I am sure you do.I would now resume the step by step guide of showing you how to perform intense data analysis with sql.The below code yieds(see Image below)

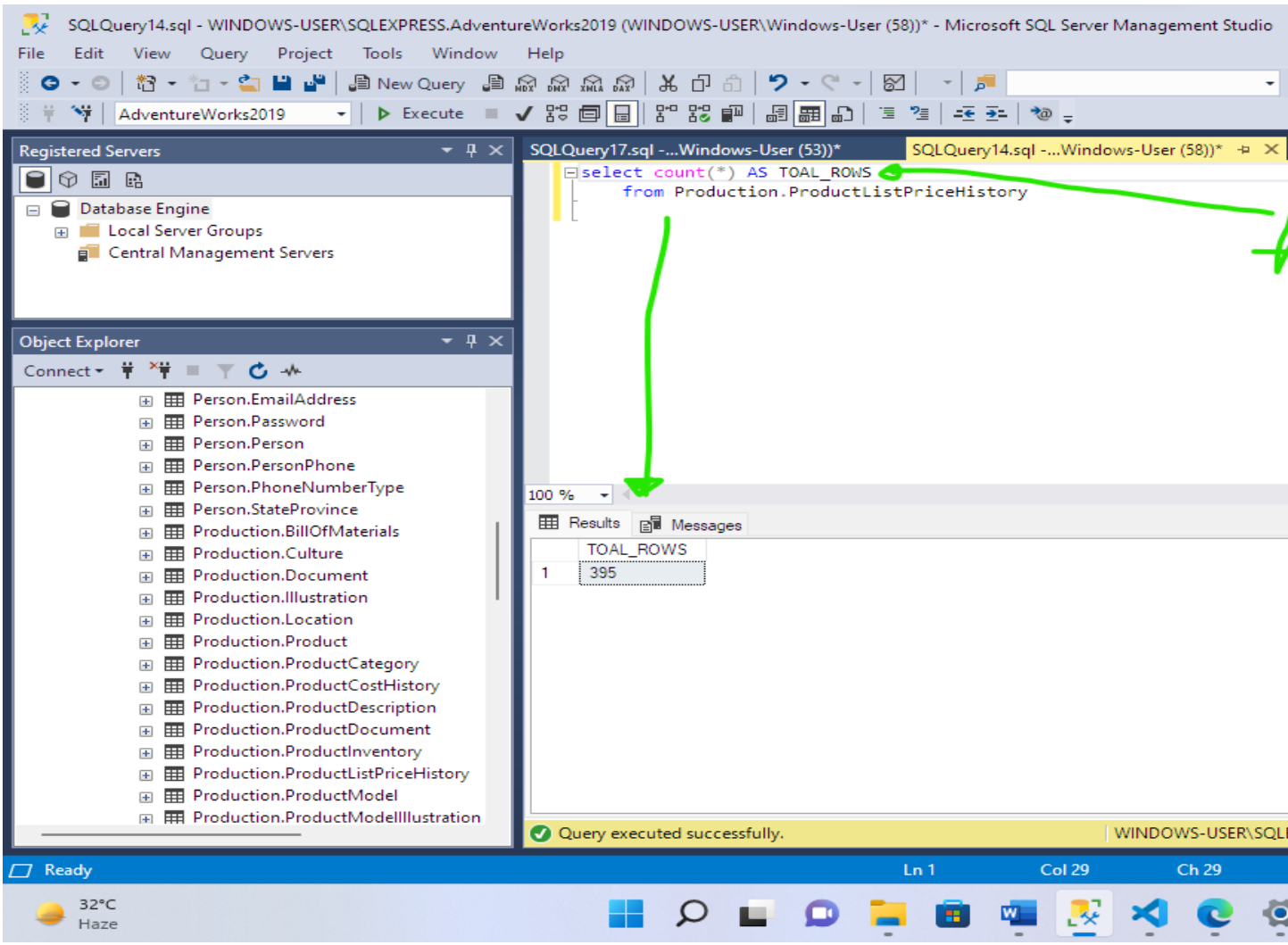
```
select *
        from
Production.ProductListPr
iceHistory
```



You can know the total number of rows in table using the below sql code

```
select
count(*) AS
TOAL_ROW
S

      from
Production.
ProductListP
riceHistory
```



N.B:There are 395 rows.

[ASCENDING ORDER]

To sort your data in sql,you can use the order by sql keyword,demonstrated in an sql code

s

e

l

e

c

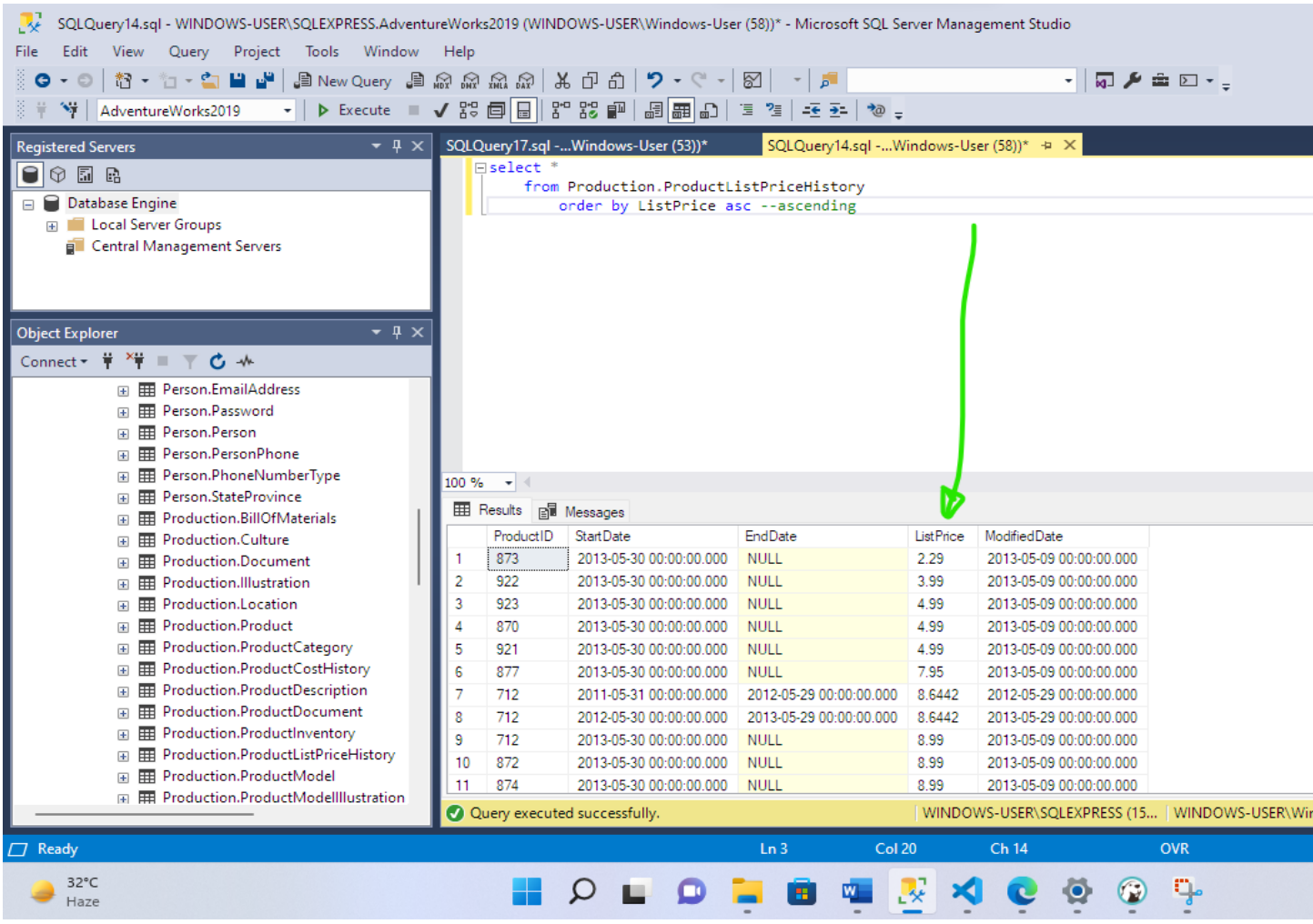
t

*

from Production.ProductListPriceHis

try

order by ListPrice asc --this line of code sorts in ascending order(smallest to largest)



[DESCENDING ORDER]

To sort your data in sql,you can use the order by sql keyword,demonstrated in an sql code

sel

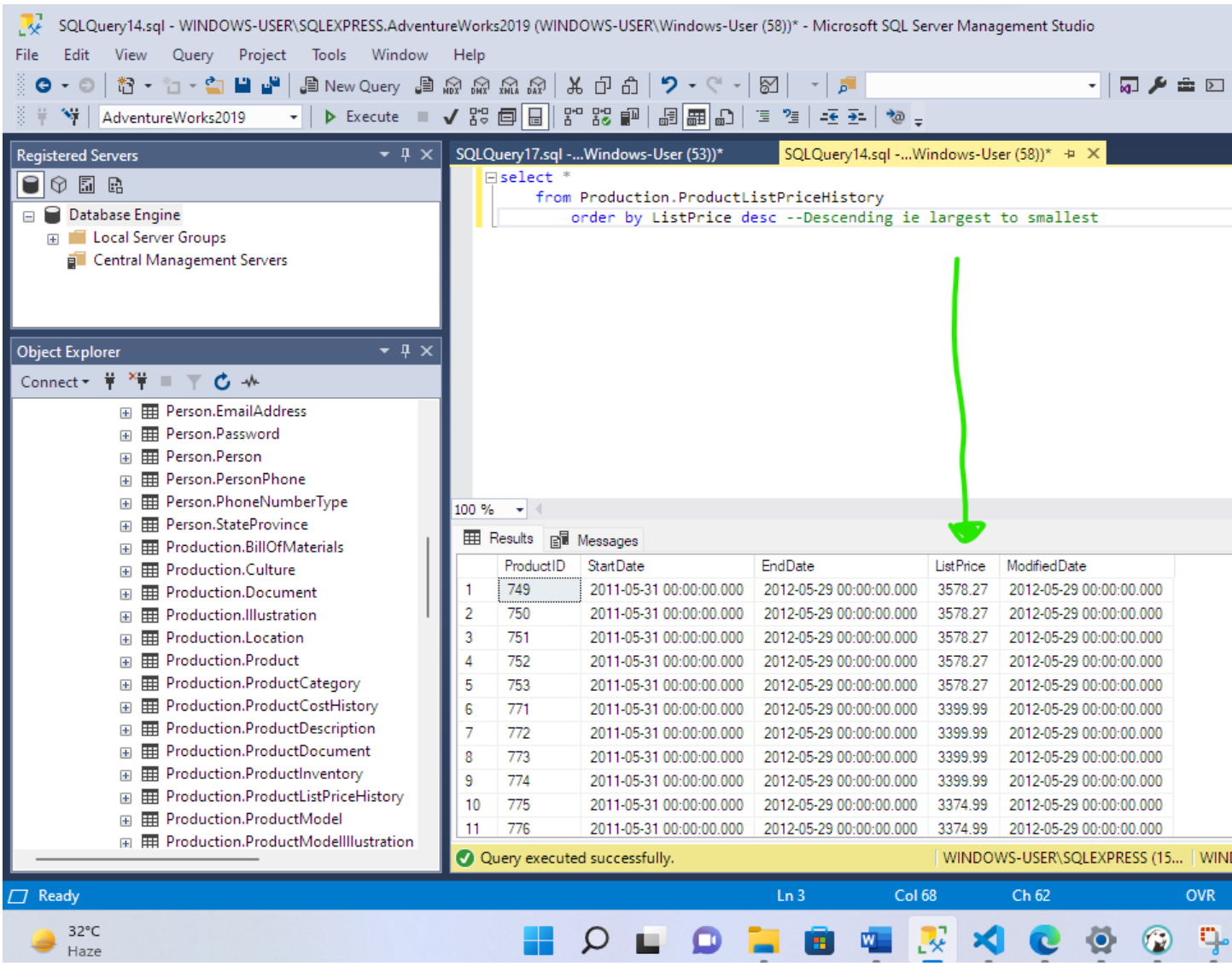
```
ect*

fromProduction.ProductListPrice
```

History

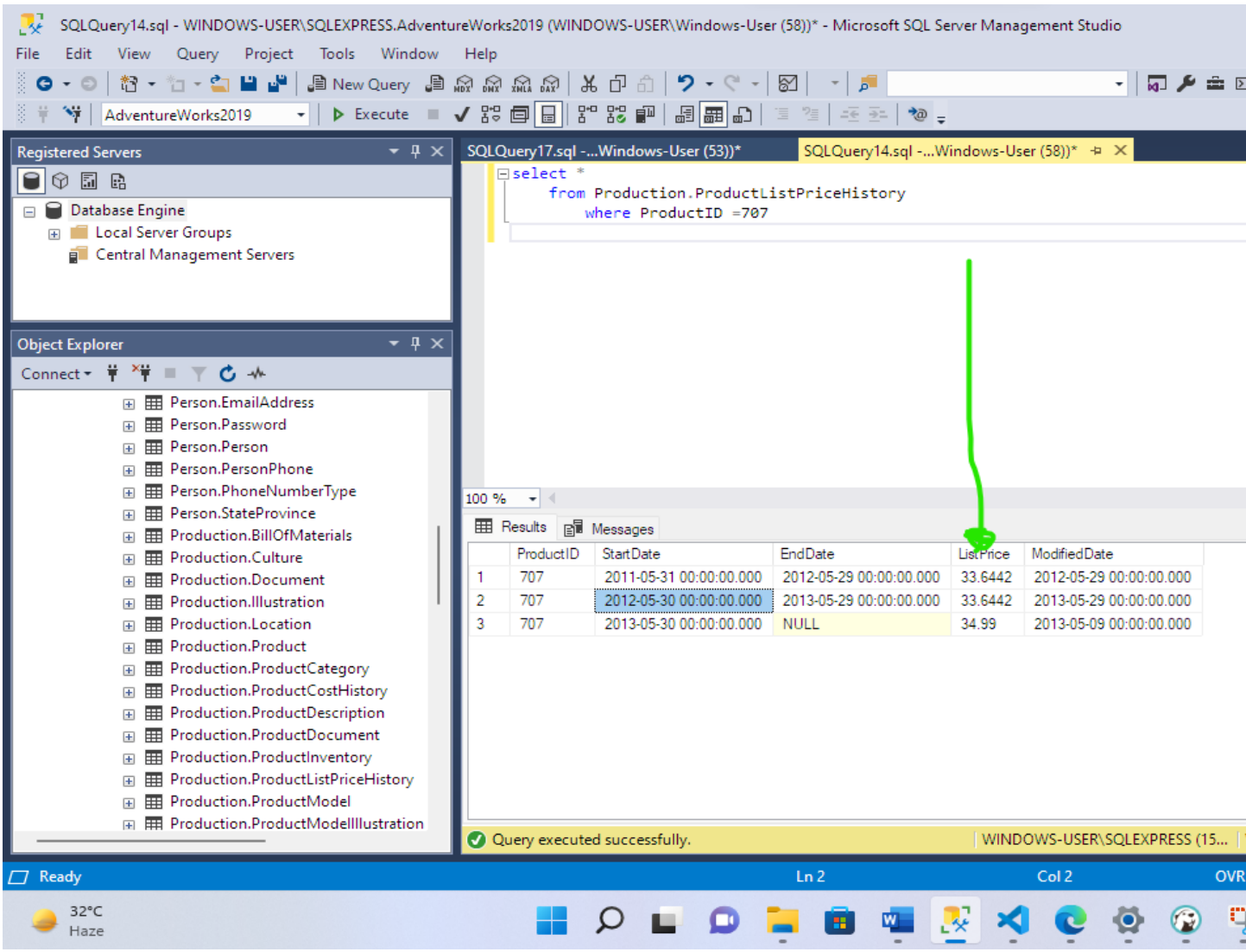
orderbyListPriicedesc--Desce

ndingielargesttosmallest

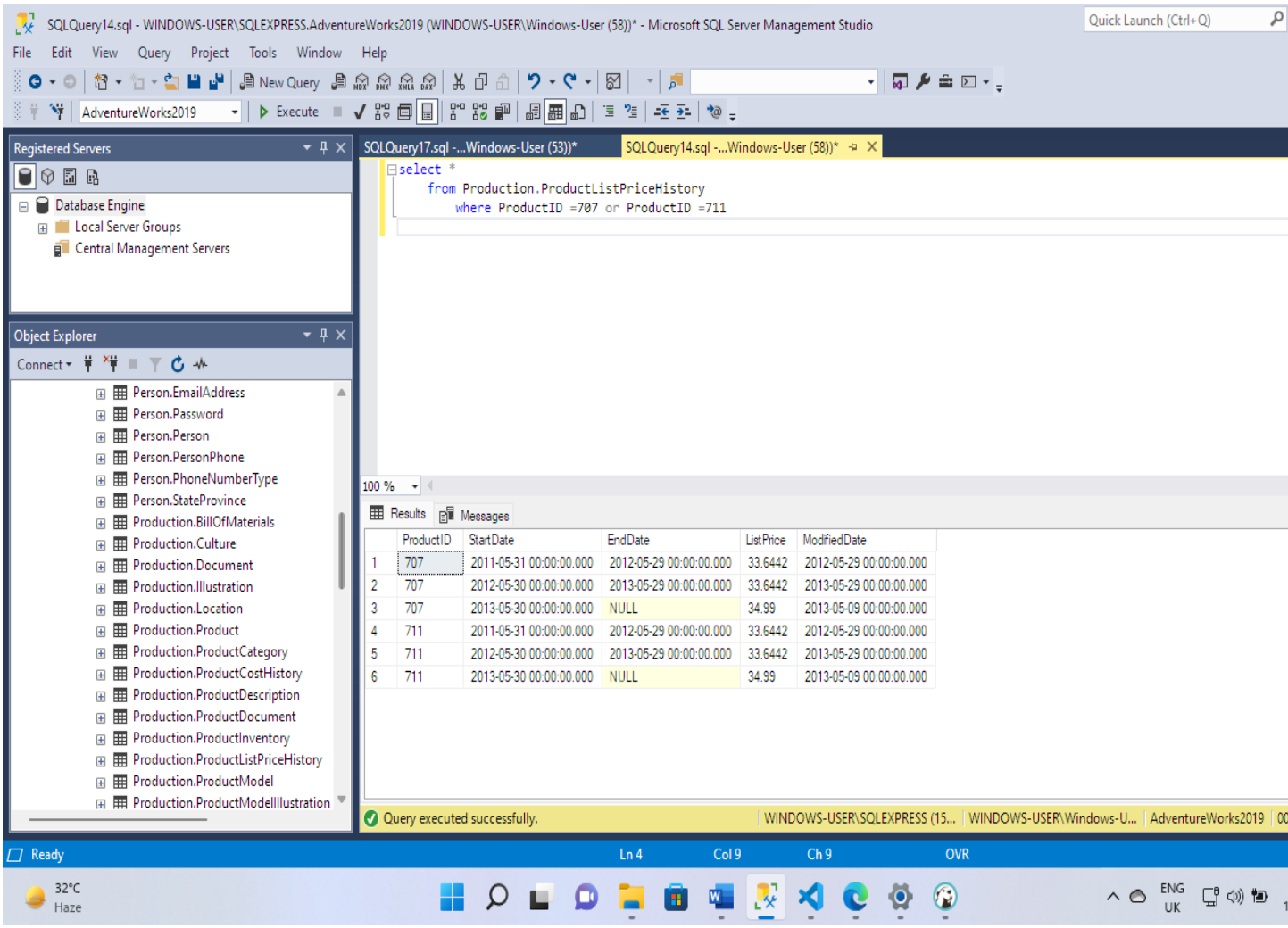


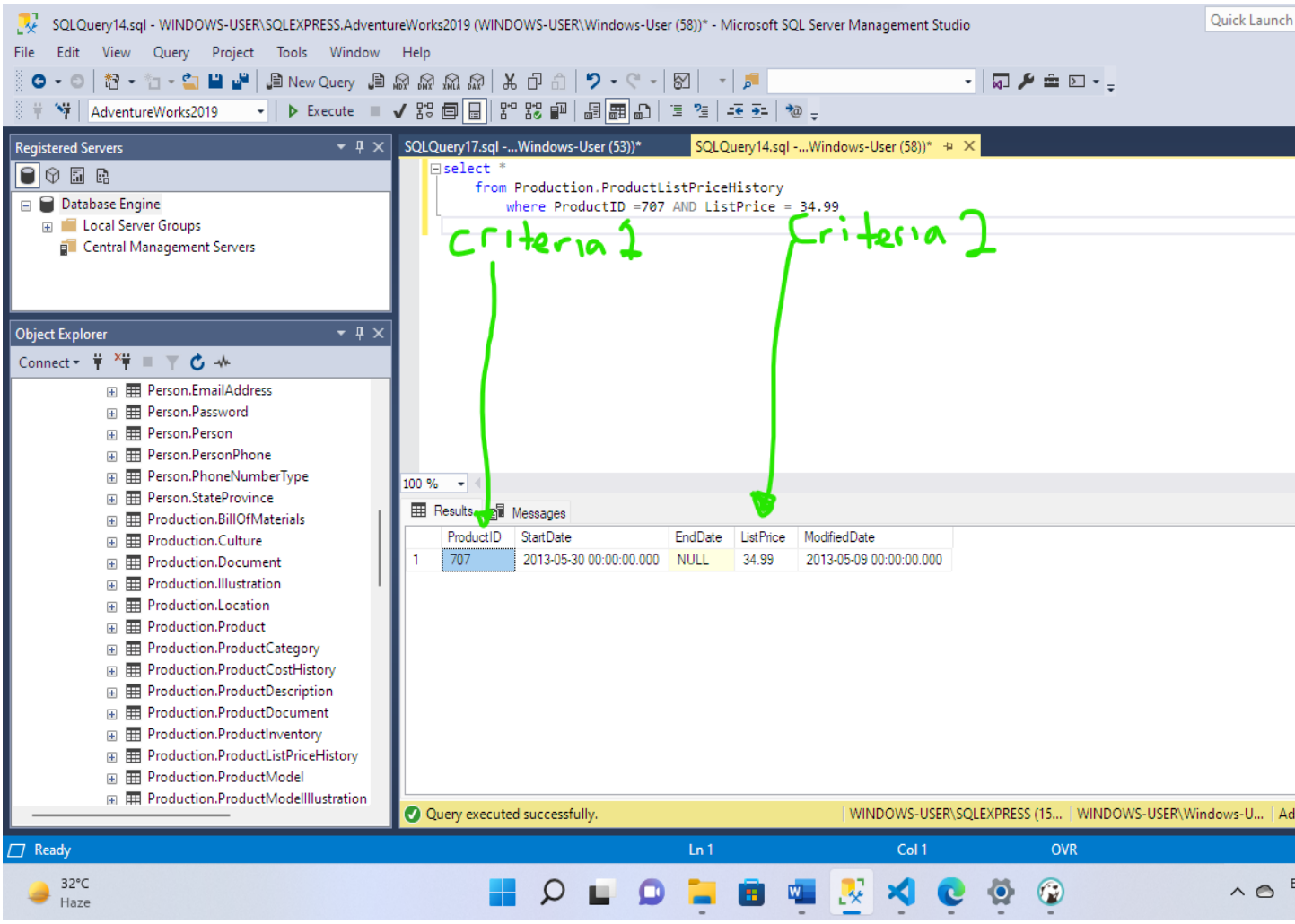
Can you physically see the difference?

You can also use the where keyword in sql to filter your data.Below is the sql code



N.B:You can observe your dataset present in sql database form before analysing by using **select ***,this would enable you carry **WHERE/OR** operations very well in sql.Below is an OR operator sql code.See also AND operator sql code


SQLQuery14.sql - WINDOWS-USER\SQLEXPRESS.AdventureWorks2019 (WINDOWS-USER\Windows-User (58))* - Microsoft SQL Server Management Studio
Quick Launch (Ctrl+Q)
File Edit View Query Project Tools Window Help
New Query
AdventureWorks2019
Execute
Registered Servers
Database Engine
Local Server Groups
Central Management Servers
Object Explorer
Connect
Person.EmailAddress
Person.Password
Person.Person
Person.PersonPhone
Person.PhoneNumberType
Person.StateProvince
Production.BillOfMaterials
Production.Culture
Production.Document
Production.Illustration
Production.Location
Production.Product
Production.ProductCategory
Production.ProductCostHistory
Production.ProductDescription
Production.ProductDocument
Production.ProductInventory
Production.ProductListPriceHistory
Production.ProductModel
Production.ProductModelIllustration
SQLQuery17.sql -...Windows-User (53))*
SQLQuery14.sql -...Windows-User (58))*
select *
from Production.ProductListPriceHistory
where ProductID =707 or ProductID =711
100 %
Results
Messages
ProductID StartDate EndDate ListPrice ModifiedDate
1 707 2011-05-31 00:00:00.000 2012-05-29 00:00:00.000 33.6442 2012-05-29 00:00:00.000
2 707 2012-05-30 00:00:00.000 2013-05-29 00:00:00.000 33.6442 2013-05-29 00:00:00.000
3 707 2013-05-30 00:00:00.000 NULL 34.99 2013-05-09 00:00:00.000
4 711 2011-05-31 00:00:00.000 2012-05-29 00:00:00.000 33.6442 2012-05-29 00:00:00.000
5 711 2012-05-30 00:00:00.000 2013-05-29 00:00:00.000 33.6442 2013-05-29 00:00:00.000
6 711 2013-05-30 00:00:00.000 NULL 34.99 2013-05-09 00:00:00.000
Query executed successfully.
WINDOWS-USER\SQLEXPRESS (15...
WINDOWS-USER\Windows-U...
AdventureWorks2019
Ready
Ln 4
Col 9
Ch 9
OVR
32°C
Haze
ENG
UK



- **THE END**
  We have come to the end of the step by step guide for data analysis with sql